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J. H. Miner

MINER'S MANUAL

of

SAW HAMMERING AND FILING.

1905 EDITION.

A COMPLETE COURSE OF INSTRUCTIONS ON SAW HAMMERING AND FILING; INTELLIGENTLY, YET PLAINLY, WRITTEN AND ADEQUATELY ILLUSTRATED WITH ORIGINAL DRAWINGS BY THE AUTHOR AND EMBODYING A BAND SAW TREATISE AND MISCELLANEOUS HINTS FOR THE MILLMAN.

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ATLANTA, GA.

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INTRODUCTION.

In presenting this my Fourth Edition on Hammering Circular Saws, I am pleased to state that after many years experience in the fastest mill in the Southern States, and in repairing all kinds of saws from almost every State in the Union, I find I cannot deviate very much from my original drawings, but I will, in this edition, go into further detail to better enable the inexperienced mill owner to succeed.

These instructions are infallible, and combine the principles adopted and practiced by all successful filers. Success means the mastering of any circular saw in any kind of timber.

It is unnecessary here to elaborate on the merits of the simplicity of my method, as they have been before the public since 1888, and there are now over 5,000 users of some in practically every section of the globe.

BAND SAW TREATISE.

To this Manual is added a Treatise on Band Saws. It is so plain and simple that any practical circular or band filer cannot help but succeed if he follows the instructions given carefully. I have endeavored to avoid the use of "big words" and long phrases, that the proper idea may be readily conveyed. Remember that to succeed in the saw filing line requires a talent that books or personal instruction cannot impart, and only those adapted come up to high rank, but yet by close study the average filer can produce much better results.

Shingle and Gang Saws fully treated; how to hammer, set and file such saws.

In short, a saw properly hammered, as per these instructions, will not heat or make any bad lumber. When I say this I make no exaggeration. Hundreds of the best filers in the world testify to this fact.

These instructions are compiled after years of the closest study. No man in the United States has sought information more eagerly than I. . I have bought every work published and written on saws, have watched new saws very closely, and must confess that after over twenty-five years of actual practice in hammering and repairing saws I have found the secret of the proper place to put the tension in a saw. I make no boast, but I do challenge the world to prove that my instructions are not only correct, but explained in the simplest manner.

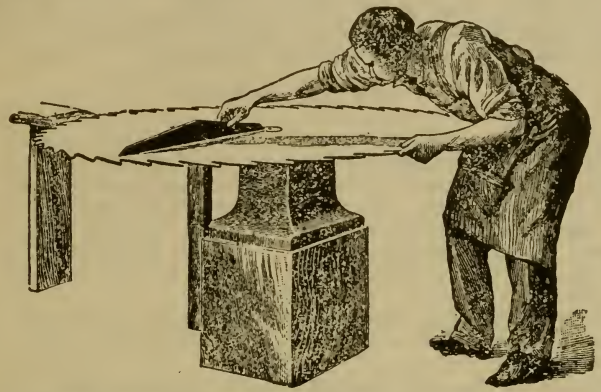
Fraternally yours,

J. H. MINER,

Lumberton, Miss, 1905.

THE TEST.

This cut, fig. 8, shows how a saw must be tested. It is raised clear of the anvil, supported on each edge with a straightedge applied at exactly right angles to the supports. These instructions apply to this test only, and failure will result if the saw is tested in any other way.



Use a round and straight pene hammer or doghead, and cross pene of about 5 lb. weight. The instructions herewith also apply to hammering on the anvil. Use no pad, unless the saw, by accident, is dished over the collar. Better go slow, and be in the right, than to hit sledge hammer blows and ruin or break your saw.

Use the round face for tensioning; the long face is seldom used, and only on ridges or twists.

STRIKING SOLID BLOWS.

The filer should become impressed with the fact that he should strike **solid blows;** any man who cuts or indents his saw is destined to **failure.** Remember this and be governed accordingly. Use a 4-lb. hammer on the light anvil.

The man who follows these little details closely wil soon command from two to four dollars per day better pay.

The impatient, or the reckless, man has lost "his calling."

MINER'S SAW GUAGES.

I have furnished to filers and mill owners over 2,000 Guages. They reach from eye to the rim, and are made with the proper curve to speed and guaranteed to be correct to the thousandth part of an inch. I have a template and number of all that I have made, and with the record I have I can fit any saw at any speed. There is no one in the world, saw makers included, that can make an accurate guage on the correct principle.

These instructions are given by the straightedge, as this is the correct way. A guage is as simple as a caliper set to fit a given shaft. The operator makes the fit much better than without it, but he does not know the exact size. So it is with my guages; they are the only thing in the hands of the filer who prides himself and wants good results.

Some filers will not use them, because they give too much work; that is, they show defects that the straightedge misses. Some filers have obtained good results without a guage, but for immediate results the guage is indispensable.

SPECIAL NOTICE.

Your success depends on you memorizing every word of this little book. I have put the information in as few words as possible. I earnestly ask you not to attempt to hammer a saw until you memorize every part. I have had many questions asked me that were as plain as could be made in print. You are at liberty to write me any question you wish and I will cheerfully answer, but before writing refer and see if it is not herein answered.

In revising these instructions, I have endeavored to make plainer some parts, where many questions have been asked. Please study very carefully sheets Nos. 1 and 2, and when you have done so you have learned something about a saw.

It is hereby agreed that you will not allow anyone who is interested in saws to read this book, nor to impart any information herein to any person or persons.

Please have the honor to protect me, and refer interested parties to me or the publishers.

INSTRUCTIONS ON HAMMERING, ETC.

In the eight sheets on Circular Saws we will assume we have to run at high speed and fast speed, say 800 revolutions. Further on I will treat of slower speeds. The slower speed saw is hammered precisely as the higher speed, only that it has less tension. We are using only three straightedges, a 6-inch, 12 inch and 24-inch. The 24-inch is long enough for any saw. The straightedges are lettered and I will refer to them by the letter only. A, in sheet No. 1, is a 24-inch, and C is a 12-inch.

A WORD ABOUT IMPOSTORS.

Everything of merit is couterfeited. Occasionally I hear of a man "bumming around ruining millmen, claiming to have worked under me, or to have 'my book.'" The man who can not show these instructions and a guage with my name and address, with number stamped on it, is an imposter. I positively refuse to sell these instructions to men that are not reliable and honest.

A saw opened to speed and uniform would, to the average man, seem to be all there is to it. Right here is where 99 out of every 100 stop. The secret of hammering any saw is to get the tension in the right place, or the saw will not stand up and will be broken.

Sheet No. 1, is a saw that will heat on the rim; will run out in a slab and into the cut after the heart is past. In pitchey or frozen timber it will throw dust and heat quickly on rim.

Sheet No. 2 is a saw that will not run straight, but will dodge hard places and run out on a slab, but will not heat like No. 1.

Sheet No. 4 explains how to convert Nos. 1 and 2 into perfect saws as Nos. 3 and 8.

Please note these instructions very carefully, as simple as they are you must get them fully into your mind to succeed. Bear in mind, that all the blows are applied on the full places. Nine-tenths of your hammering will be on the bare anvil with the round-faced hammer.

Before beginning on a new saw some distinction must be had between the terms now in use. Some call an open saw (a saw with tension in it) a stiff saw, and the more tension or opening the stiffer the saw is claimed to be. I recommend a stiff saw to be hammered in the body to give it tension, making it more open.

I have men to write that their saw is too stiff or too limber, and unless a description is given of the action of the saw, I cannot tell whether the saw is too open or too stiff. We will call a stiff saw a saw that is firm—that is, will not dish or spring back and forth by pulling or pushing the eye.

An open saw is a saw with a loose center, and the more dish or looseness it has, the more open the saw is. So do not get mixed up on these terms.

Accordingly the speed depends on the amount of opening a saw should have. A 50-inch saw at 400 speed, warm mandrel, 15 H. P., should be a stiff saw, as there is no perceptible expansion from this small saw at so slow a speed on a warm mandrel. (Saw No. 7 shows a Stiff Saw).

In testing a saw for tension it must be tested as shown in cut (Fig. 8). Any other way is deceptive, and and filer who tests a circular saw and any other way cannot successfully hammer a saw. It is true that ridges and full places can be located while hanging on hook or while standing on edge. Figure 8 shows that the straightedge is applied at right-angles to the supports holding the saw. A variation of but little from this right angle position of the straightedge is allowed, and saw should be moved for every 6 or 8-inch test. A stiff saw will show some little light on the radius, as shown in cut, and when applied directly across the eye it should rock or ride considerably, same as No. 7.

To increase the opening or tension the saw must be hammered from near the eye to within 4 inches of the rim, but where irreg-

ular places are found they must be removed, and it is often necessary to hammer a saw that is in bad shape as close as 2 inches of the rim, or closer, and down towards the eye, inside of the collar; the saw should be turned over frequently, and do not hammer one side too much, or saw will be dished too much. Be careful about this. Nothing is gained by trying to rush on this kind of work.

A saw may appear very stiff that has been hammered through or set over too much, and when brought back equal it is found to be too open.

Saws that have been hammered into bad shape will perplex many good men. Also a saw too long on the rim, that is, so long that it assumes a winding position, and when rolled on the floor it will buckle or change its position. Many mill men run such a saw by keeping it hot in the center. To correct such a saw it must be hammered in the body, beginning nearer the collar than the rim. What is wanted is tension, and to work too near the rim would make it worse. Such a saw hammered at first as near as 6 inches of the rim would make it worse, while a high tensioned saw would retain considerable tension hammered 6 inches from the rim.

When a loose rim saw is hammered enough to make it stiff, so it will show a little drop as in Fig 8, then it will be safe to hammer nearer the rim, and if a 24-inch straightedge rocks or rides considerable across the eye, this indicates that the saw is too tight near the collar or eye. A 12-inch straightedge will locate exactly the tight places. If it rocks across the eye, and at the collar line, would indicate that the metal was too tight right around the eye, but a few blows here are necessary, and they must be light; remember you want to produce a No. 3 saw. If straightedge shows tight places about the collar and beyond towards the rim, those about the collar must not be touched until the finishing is done, then there will be no danger of getting the eye too open.

Keep away from the eye until about the proper tension is had.

A loose rim saw will show no drop under center of straightedge as in Fig. 8, but the saw will drop from each end of the straight-edge, under A. and B.

It is often very difficult to get solid blows on such a saw, and a helper should be had. Many men make mistakes in concluding that such a saw is twisted, and use the long-face hammer, only to ruin the saw. Nine times out of ten a twisted saw is no more than I have described, a loose or long rim.

A saw that has been hammered into bad shape and is twisted requires an expert to correct it; see "A Twisted Saw and How to Correct it."

Unless a saw is dished to start with, the same amount of hammering will be necessary on both sides. Do not hammer a saw through one way too much, for by the time you get it back straight, you might have it considerably out; that is, with too

much tension. When nearing completion work lightly on both sides and get an absolute uniform drop.

Mark your saw with chalk, always on the high places; do not mark a high place and a less higher place that are close together, for the high place being hammered down will take the lesser place with it. I recommend three (3) distinct marks on a saw; one for heavy, next for medium and the third for light, for the reason that places in saws are very irregular and it helps you to regulate your blows and this can only be done by marking saws so as to know whether to strike heavy, medium or light blows.

A fine emery wheel, or piece of emery cloth tacked to a board, to scrub or brighten the saw will show exactly where the high places are. If you use a "slicker" (which I earnestly recommend to those who want perfect results,) mark saw with a blue lumber crayon, as the scrubbing will not remove the marks. Of course, no one would "slick" a saw off and hammer the bright spots before using the straightedge on guage to locate the places requiring hammering, for every bright spot will not show a high place under the drop test, as in Fig. 8.

If the saw is stiff, like sheet No. 7, then "slick" it off and hammer the bright spots, as shown in sheet No. 6. When your saw has run down,(that is needs more openng) you can safely "slick" it, doing some amount of hammering on both sides, then finish with the guage on straightedge.

SAW TENSIONING.

The art of hammering saws properly is understood by but few in its entirety. Nothing among the arts has made as slow progress as saw hammering. This is accounted for in several ways.

The saw people have long guarded the art as much as possible, owing to the trouble it was likely to give them with their saws, and only of late years has it been considered that anyone out of a saw shop could hammer a saw. Today this has all changed, and the man has only to go into a modern band or circular mill and he will find saws in more perfect condition than they can be put into in the shop.

It is seldom among the best mills that new saws are received that will do as good work as they can be made to do.

There has been such an increased demand put upon saws that it is now necessary for every filer in a good mill to be able to hammer his own saws, and to do it properly too.

Nothing has as many theories and misconstrued terms as saw hammering, and it will be my aim to get these complicated terms plainly set forth, so as to be of benefit to the profession.

It will take up the word "Tension," and discuss what it means, for this must be understood before it is safe to put one blow of the hammer on a saw. All log saws must have more or

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less tension, according to the size and speed of the saw. Also, this is governed by the power, for a 56-inch saw at 700 speed, 40-horse power, and the same saw at same speed, 250 horse-power, would be two different saws, and yet both are the same size, guage and speed. Tension is the amount of spring, dish or opening a saw has. A saw that has no tension is firm; that is, perfectly stiff.

The tension, or opening, must be in the proper place—must be uniform—or the saw will not run steady or cut straight lumber. A 60-in saw at 500 speed, say 40-horse-power, should just stand straight while standing on its edge on the floor. If it is leaned as much as one inch, the center will bag or drop. If mandrel runs warm, then it should be a little stiffer. What deceives more men than anything else is not knowing where the tension should be in a saw. They learn that by hammering near the rim, the tension is taken out, that is, it is made stiffer, and by hammering near the collar or inside the body of the saw, that it will give more tension. This is true, but it does not signify that when he gets his 60-inch saw, as described, for 500 speed, that it will cut a straight line, though the tension may be uniform, and the saw absolutely true and steady while running, and yet it might run out as much as three inches on the side of a log; it might be like Nos. 1 or 2.

BROKEN SAWS.

Nine-tenths of the broken saws are caused from irregular tension; that is, the tension in the wrong place. Some saws are so tensioned that a 60-inch saw, at speed described, would have to lean two or three inches before the center will drop, and should it be let down by hammering near the rim, to the tension I have here described, then it would not run. Right here the filer establishes his reckoning, and while his saws do fairly well, they do not do anything like the work they would if tension was in the right place. I admit that the way some saws are tensioned it is necessary to give them more opening than recommended, and to correct the error fully, often requires half a day's hard pounding on his saw, which is a No. 2.

All filers that have broken saws run very open or too stiff saws, and the filer that has no broken saws does not run a saw too open. Only a few years ago, it was considered of little import among the fast mills for a saw to occasionally break, and among many mills today there can be found as many as a dozen to fifty saws broken. Millmen, by more intimate associations, are finding out that what causes their saws to break is in the filer, and not in the saw.

True, there are some saws that seem to be bad about breaking around the collar. It may be that this particular make is unfortunate in getting into the hands of incompetent filers. As a plain illustration of the fogyism in hammering "so near" the rim and "so near" the collar; never do anything inside the collar

or near the eye, and not nearer than three inches of the rim, they say. Such hammering produces a No. 1 saw, and unlss it is hammered nearer the teeth and inside of the collar, right down to the eye, no man living can make it run, and if a man does not know where the tension should be, it is only a question of time until the saw masters him. He then lays it aside and gets a new one, and the millman, knowing no better, is imposed upon.

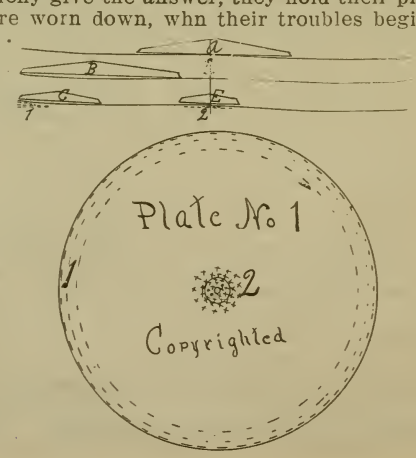
A saw properly cared for will continue to run better until it is too small to do the work. It is a mistake that the steel becomes crystallized or rotten, as some claim. I, like the Apostle Paul, thought for years I was right in advocating this theory, but since "seeing the light," I have changed my theory, admitting that I was wrong.

SAW NO. 1.

The accompanying drawing, sheet No. 1, represents a saw with tension too near the rim, and with the center too tight or firm. Figures A and B represents a 24-inch straightedge applied, at B on the radius and at A directly across the center.

This plate does not represent a crooked, uneven, irregular saw, but a saw with an absolutely uniform tension, true and straight while on the mandrel, and to all appearances is a perfect saw. Yet it will not make a straight line and will run out badly on the slab, or side of the log, and will run in after the center is passed; it will also heat on the rim and throw dust.

It is essential to illustrate this because many filers strive to get a true, uniform, saw and their saw will not run. What causes this condition is the question of ten asked, and I will therefore, briefly give the answer, they hold their places very well until saws are worn down, whn their troubles begin.



Saw makers, and all instructors in the art of hammering, state very plainly not to hammer near the inside of the collar; this is good advice, provided a man does not know exactly what he is doing. As there is not one saw filer in a great number who knows exactly where hte tension should be, we must accept the saw-makers' sattement as literally true, for a few blows about the collar will ruin a saw unless a man is well up in his profession.

New saws usually come right; they may be irregular, but the proportion of drop or opening under figures A and B is correct. As a saw is worn down the gumming that is necessary expands the rim and reduces the opening under the straightedge, as shown at Fig. 8. To overcome this elongation of the rim it is necessary to hammer the saw about half way between eye and rim, but be careful not to hammer any nearer than, say, 6 or 8 inches of the collar (this for many years was my advice).

The saw performs its work about as well as when new, or better, if it has been gotten uniform. Right here is where the filer asserts himself, for he has made the saw run well, but there is a secret trouble creeping into the saw, and the next hammering may bring the saw to a point where it does not do so well. The trouble is in the eye and collar; it is gradually becoming like illustration Fig. 1. The metal at the eye is becoming gathered, puckered and tight, or as if it had been contracted, and until it is hammered to overcome this trouble, no man can make the saw run.

This condition comes about very slowly in some saws, and in mills where saws are abused, a 60-inch saw may be worn to a 56-inch without much harm being done, provided the mandrel runs hot, for a hot box helps this saw, provided it is not too open, in which case the rim will heat.

As the cut herewith is to serve as an illustration and to give the proportions between the A and B test, I will describe a saw like this, that it may be more fully understood. A 60-inch saw at 600 speed, say 40 h. p.; if it is a No. 1 saw, the 24-inch at A will rock fully 1-32 inch, and in extreme cases will rock or ride as much as 1-16 inch, while B will drop from 3 to 5 thicknesses of a postal card. A 60-inch saw at 800 revolutions, may not rock at A, but may fit very near flat, but B will drop from 5 to 8 thicknesses of a card.

Such a saw might drop one thickness across eye, and running on a cool mandrel, would not cut a straight line. For a safe rule, and one that can be relied on, is to give from one to three more thicknesses of card under B than under A.

If the saw runs at a slow speed, with limited power and a warm mandrel, one thickness under B while A would rock to the extent of two thicknesses. To correct such a saw as this it is necessary to first hammer near the rim, as at 1. This must be done on both sides of the saw alike, as we are not treating a crooked or warped saw. The hammering should be within one inch of the rim, blows applied very thick or close, but

solid, reducing the distance and heft of the blows within, say, 6 inches from the rim. Work both sides of saw until it is about stiff; then hammer about and inside of the collar on the highest places that a 12-inch straight-edge will show, turning saw over frequently and hammering very carefully. When saw shows sufficient tension to dish a little and equal both ways, then work the rim; continue this operation until you have gotten the proportion as above described under the A and B test for a high speed saw, good power and a cool mandrel; a difference of but one thickness of card is necessary.

Do not hammer any saw too much on one side before turning it over.

This No. 1 saw when corrected will show no light under E, which is a 12-inch straight-edge, and for limited power a small saw on a hot mandrel it should rock a little also under A test. C should show just a little light for limited power and a small saw, and with the most drop half way down from eye to rim, a perfect saw will be attained.

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SAW NO. 2.

We will now discuss saw No. 2, which is quite the reverse from saw No. 1. To gain the necessary information about tension in saws it is important to study these twe extremes very carefully. Saw No. 2 has too much tension or opening about and inside of the collar, while that part of the metal near the rim is too tight or firm. It will be noticed that Saw No. 1 is the reverse of this, and to remove the surplus tension about the collar it is necessary to hammer the saw near the rim similar to No. 1, except that the hammering is done not quite so near the teeth.

Any part of a saw that shows too much sag, drop or opening must be hammered near the edge to let it out; this applies to circular and long saws.

There are some men who hammer a saw similar to No. 2 for a good saw; the result is that the saws are soon cracked al around the collar. Others make a No. 1 saw by keeping away from the collar which, as previously stated, is right, unless it is thoroughly understood what is wanted in a saw. I have had men ridicule the use of a pad on the anvil for straighening a saw that by accident had been turned over the collar. Such men soon produce a No. 2 saw by hammering on the anvil.

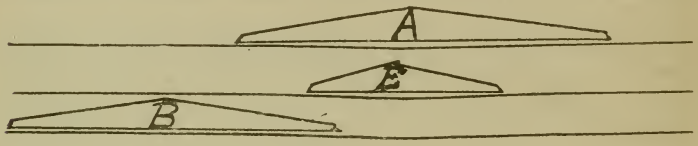
A saw will not do anything like the work it ought to do in this condition, and I have seen some saws on a cool mandrel doing very good work in this condition; men of limited experience have been led to believe that this is a perfect saw, but no man can decide anything like this unless he has had long experience and been a close observer. What one man would call a perfect saw another would condemn.

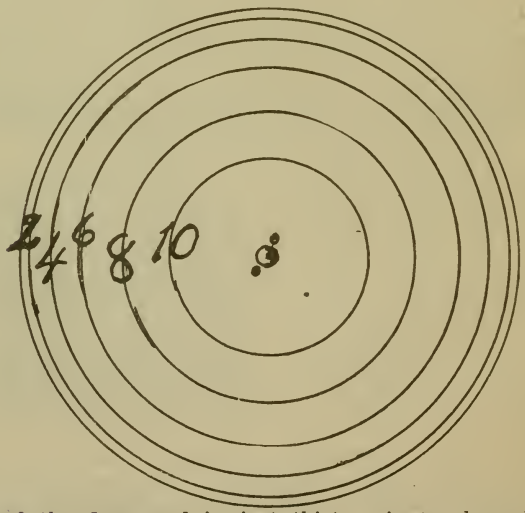
Now to correct this saw, and remove the surplus tension shown under figs. A and E, there is a good deal of work to be done. Lines 2 to 10 show that portion of the saw must be hammered. The greatest amount being done between lines 4 to 8. Fig. 2 is a line 2 inches from the rim, and as near as 1 inch of the rim must the hammering be done before the saw is gotten right, and both sides of the saw must be worked a dozen times or more to get it just right.

Now, some experts will say that thirty minutes, or an hour at best ,is sufficient to hammer any saw. Such men know nothing about a saw like Nos. 1and 2, and yet every saw that is not properly tensioned is somewhat like either of these two saws.

A large mill in Mississippi started up with six new saws, and they had a filer at $6 per day. All went well for several months, but in about a year the saws were worn down to 56 inches and were not doing so well. The mandrel was heating, and this helped the saws, for the filer was one of those men who do not hammer any nearer than 6 inches of the center. The real trouble was this:—his saws were gradually getting

into the condition of No. 1. The mandrel was turned and re-babbitted in repairing the mill, but when it started up not a saw in the mill would run. They then purchased four new saws from another saw making concern, and these saws were too tight in the eye, somewhat on the order of saw No. 1. They would not go, so the saw makers sent their man out, and he found it impossible to make them do better. Other mills were having some broken saws, while this mill had none; so the firm decided to keep the old filer who for months had proven his ability. When the firm was about at their wits ends to locate their trouble, there came along a tramp hammerer, he evidenced all the signs of a "booze fighter." He said he could handle the trouble, and he was duly put on to the job. He took hold of one of those new saws, ordered everybody out of the file





room, closed the door, and in just thirty minutes he rolled a saw out. Of course, it would not run, so the mill help all said. However, the sawyer put it on and it never made a bobble, cut every line alike and it could be heard to "holler" for a mile.

That settled it; he got ten dollars each for hammering the four new saws, got on a drunk and was gone.

The company fired the old filer, and got another man who did fairly well, but his saws after a time cracked around the collar. After a few years unsatisfactory work, the circular was taken out and the band installed.

The point I want to impress with my readers at this juncture is that, because one man can hammer a saw that another has filed on is no evidence that he knows anything about a saw. The hobo filer knew his business, and any man that cannot make any saw go is not on to his job.

An extreme case of No. 2 will require several days to get it correct, uniform and smooth.

A FEW WORDS ABOUT EVEN TENSION.

There are men who know where the tension should be in a saw, but they are not mechanics enough to get the saw uniform, and one of the reasons is that they strike too heavy or an awkward blow, cutting or denting the saw.

There are but few men who have smooth, bright, saws free from hammer dents or cuts. It is necessary to have a rig that a man can handle a saw on easily, and strike every blow solidly.

Now, after hammering each side of the saw several times, there will be but little change noticed under A and E, and many men become discouraged and quit, when in fact they are doing the right thing. No man can correct such a saw as No. 2 in any other way than as I have directed. The saw may be a high-speed saw, and but little hammering at 2 and 4 will bring about a great change in the tension, making it much stiffer, but this amounts to little more than one blow towards getting the saw right.

The illustration herewith shows almost a stiff saw. Now, if too much hammering is first done near the rim, the saw will become too loose or long on the rim, and will assume a twist. Care must be exercised to hammer in the body of the saw, first between 4 and 8, and when saw shows too much tension go out nearer the rim. This saw, as well as No. 1, must be hammered to conform to No. 3.

Do not jump at the conclusion that all such saws as Nos. 1 and 2 are uniform in tension, and if not they should not be hammered on circular lines as shown, or the saw will be ruined. The straight edge must be used on every part of the saw. There may be spots in such saw as No. 2, between 4 and 10 that are open, and if these places were hammered the saw would be put in worse shape, and the operator would conclude that these directions were not right, as it "would not work in his saw." I believe a man must be "cut out" and "not missed in the making" to make a good saw hammerer. Yet with proper instructions any practical sensible man who does not cuss too much ought to master his saw so as to get more and better lumber.

Hold your temper, and be patient, and you will more likely succeed.

SAW NO. 3.

Having described two extreme cases of a tight and loose entered saw, we now have plate No. 3. This shows the proper proportion or opening for saws, from the smallest power up to about 50 H. P., with some modification.

As plain and infallible as these drawings are some men cannot comprehend them. My advice to these is to seek other employment, for if a man cannot successfully hammer a saw from these directions he will never succeed.

Bear in mind that the proportion of drop under A and B determines what a saw is; suppose a saw has no tension there will be no drop under B. While A and B may appear alike, but because there is no drop under A does not indicate that it must be hammered near the collar; on the contrary, it is rather a No. 2 saw with no tension. If saw is long on the rim, A and B. will appear similar to A in No. 1; that is, the 24 will rock across the eye and also on the radius at B. If A does not rock considerably more than B, then it is a No. 2 saw,, or would be if it had any tension.

What is to be forcibly conveyed in this:

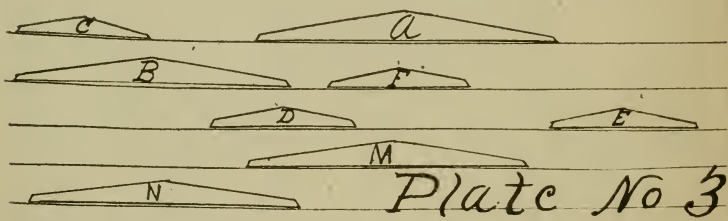


Plate No 3

The proportion under A and B must be considered whether there is tension or not in a saw.

All stiff saws must be hammered near the collar until there is sufficient drop under B to accurately determine its condition. When some opening begins to show under B, and A continues to rock considerably, then it is evident that some hammering must be done near at, and inside the collar, if necessary.

The utmost precaution must be exercised about the eye, for a tight eye will not do good work, neither will a loose eye, and the extreme of either is a No. 1 or No.2 saw.

Plate No. 3 shows the most opening at F, and should rock a little, this is say, for a 56 inch saw running 600 speed 40 H. P. cool mandrel, 7 by 8 guage or 8 by 9 guage saw. If mandrel runs hot, F should rock more, and have less opening under D than C. On such a saw the 24-inch would rock under A similar to No. 1, but the opening under B would be only about one-

half as much as that in No. 1, it being a No. 7 saw. The saw described above would be almost a stiff saw on a hot mandrel, while on a cool mandrel it would just stand straight on edge.

Suppose a man finds saws like No. 2, and has not the time to change to a number three, he can quit on it with the same drop under A as under B, and if saw is uniform it will do good work. It should be considered that if it has been run in this condition that a slight improvement will help it. The nearer a saw is like No. 2 the more dish or tension, it is concentrated more to one point; that is, nearer the collar.

A 60 inch saw at 500 speed would appear by the dish test more open with same drop under A as under B than with A flat. Filers have trouble with such saws who are not on to this. The nearer a saw is on the order of No. 1, the less drop or dish it will have.

Filers are often deceived by going into mills running good speed with a comparatively stiff saw, while at same speed in another mill saw has tension to lean nearly 45 degrees before center will drop. The former ran a similar saw to No. 1 and had a hot mandrel; the latter ran No. 2 and had a cool mandrel. Mistakes are made in attempting to open saw as much as Mr. So and So when the condition of a saw is not fully understood. As I have previously stated the filer that runs a very open saw, though he may be giving perfect satisfaction, has not his saws exactly right. I have known of cases when the filer was sick or off and another came in. The cut was so increased that the old filer was let go, though up to that time he was the best the company had ever had. What I mean is this:: A 60 inch saw at 800 speed, good power, leaning nearly to the floor before it dishes is not a perfect saw, yet some men manage to hold their jobs, opening a saw as above, running only 700 speed; such as above; such cannot be other than a No. 2.

Plate No. 3, A and B, show proportion for saw 650 speed 50 H. P., 60 inch saw, showing little light under A, while N and M show same saw 500 speed for 30 H. P. The proportion is the same, but one has more tension than the other.

I will state that from 5 to 7 inch of the rim of all log circulars must be absolutely true and flat under the drop test, for any irregularities near the rim will knock any saw out. The higher the speed the more careful should a man be. Some men can make saws go very well at 700 speed, 6 to 8 inch feed, but increase speed and feed and they are out. Same with large saws at same speed, because a man can make a 56 inch run, does not indicate that he could run a 66 inch. The increase travel on the rim is equivalent to an increase in the motion, and requires finer and closer work.

SAW NO. 4.

We have sheet No. 4 for fast mills at high speed.

This saw deviates but litle from No. 3, and this little has caused many men to lose out going into a faster mill. In this saw the tension is carried nearer the collar, the rim remaining nearly the same. For high speed and good power we must have 5 or 6" of rim perfectly true and flat. It is astonishing what a trifle variation here, will cause a saw to run bad.

Now a word about a good saw, what would be called a good saw in an average mill, would not in a better mill and so on up to the saw of 900 to 1,000 speed, driven with as strong as 500 H. P. A saw must take a slab at full speed. I am stating facts, and in many mills, if the guide is touched but a few times during the day; the sawyer will tell you that the saws today did not do so well, they will take the best saw for a standard and want all others to come up to it.

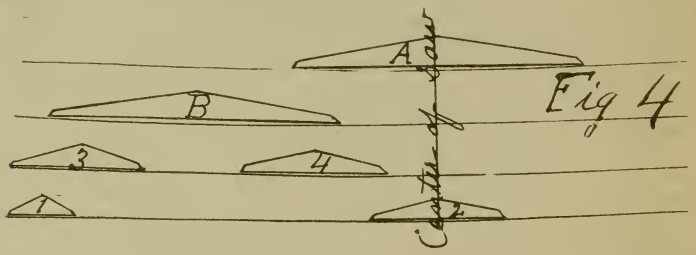


Fig 4

There is no work that is as deceptive and that is as likely to throw a man off as is a high speed saw, the variation of the thickness of a hair will cause a change that the sawyer will notice.

There are many men that can take a straight edge and make allowance for the light under it, and make a perfect saw, while others with a guage made for that particular saw cannot do as well. A & B show the test as given before. They are nearer alike than in No. 3, but yet there is more drop under B than A. In this saw the greatest tension is one-third from eye to rim, which would be ten inches on a sixty inch saw, from this point the tension gradually decreases to within five or six inches of rim.

No. 1 shows a 6" straight edge and it is quite necessary to have a short straight edge for testing the rim. No. 2 shows 12" almost perfectly straight, while No. 3 shows good light and No. 4 shows the greatest drop in the saw. No. 3 does not show much, not near as much as No. 4. Some men open 3 and 4 about alike, with same light across eye. Such a saw will dish much more than if hammered right. Allowance must be made for all saws to open across the collar, giving them more dish,

and until time permits, saws must be worked in this way; as it will require about 1-2 days hard work to correct a saw too open in the collar. Without a doubt this No. 4 is the best tensioned saw that it is possible to produce. Only an irregular tension will cause it to run bad.

Amateurs must not take this into practice, for what some would call a variation in a saw, another with limited experience could not possibly detect.

All saws should be left a trifle nearer the log about 6" from rim on log side, so that an 8" straightedge would show a little difference applied to the saw while hanging on the hook of hammering bench. Suppose it should exactly fit the rim on log side, the board side should show a trifle light. This insures saw not running in too much, and a saw should be finished on board side. About 6" from the collar this difference should be reversed, the log side showing a trifle light, while the board side will show a trifle full, and more so if the saw is thicker at the eye.

Suppose this precaution is not taken, and lead may not be right, saw would have to be lead out until probably the center near collar will heat, which is often shown by blue spots near the collar.

All saws should go onto the mandrel straight with the guide; that is the guide and face of collar in perfect line, from this point but little deviation can be allowed. It is much better to hold a saw a trifle in with the guide than to pull it out.

A saw hammered as I have directed with lead right will have to be held in a trifle with the guide.

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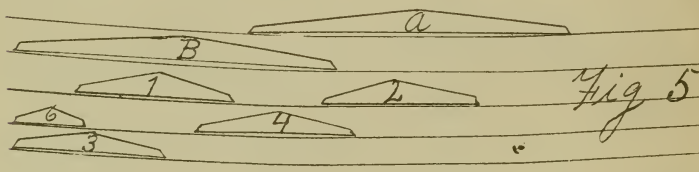
THE TIGHT LINE ARGUMENT

The theory of one of the best saw makers and some good filers is that a brace line, or rather a tight line, between the eye and rim produces the best results. While I have gotten good results from this tension, I do not recommend it to be tried except by men thoroughly posted on hammering a saw.

Figure 4 shows the most satisfactory saw for the fast mills. This tight, or box tension as it is called, is illustrated in figure 5 herewith. The center of saw under the 12" straightedge remains the same in figure 4 as in figure 5. All practical filers know that the eye may drop a little more, that is show good light under 2 and saw do good work. In Fig. 5 we have more opening under 4, the same under 3, but under 1 we have a little less drop than under 3, while 6 shows the usual flat rim.



The A & B test being very similar. It is claimed by some that this tension will enable a saw to run longer without being hammered than by the usual method. Those who claim this give a little more tension under 3; and I am also inclined to this belief. One thing in favor of this idea is that the saw does not require so much leaning opening or dish. A 60" saw will do good work having 45 degrees at 900 while the usual tension at that speed would lean much more before center would fall through.

Another method of bracing a high speed fast feed saw is as follows: The log side near the collar is offset a trifle, so that the straightedge will show saw to be a little fuller on board side about 8" from collar. On the log side about 8" from rim is the same as described on the board side. Such a saw requires that the guide be held in a trifle. The board side of saw runs constantly against the guide pin, acting as a brace or support to the saw. The saw from rim to collar is perfectly straight; the slight holding in by the guide overcomes the slight offset on log side near rim. This experiment should not be attempted by a novice, as it takes long experience and close observation to even get a saw straight, to say nothing of something that is a slight departure from a straight saw. The thickness of a horse hair would be too much of a variation in this saw.

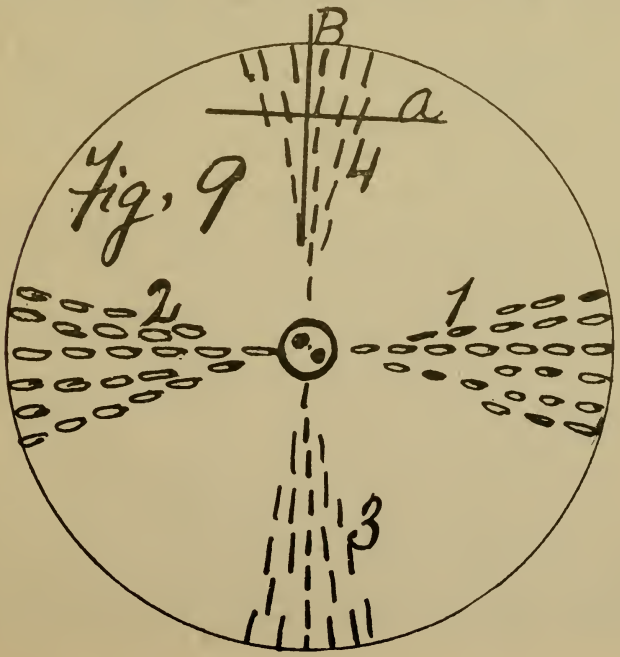
All filers should use a guage for accurate work; most of them could make their own. There is no filer but what at times has

a good running saw. Suppose he should make a guage to fit this saw and keep it to it, he could keep that saw right for a while at least. Talk about close mechanical work; there is none of it that requires the accuracy of a perfect fitted saw, yet men will hammer saws by guess, using only a straightedge. The sawyer never gets two saws alike. A machinist could as well make fits of his work by guessing at it, instead of using rule and caliper, as a filer would by "guessing" at the proper amount of light or opening under a straightedge, and yet by years of experience some men actually guess right and have good running saws. By this method they say it takes years to become proficient, and so it does.

There is nothing that has been kept back so much as the art of hammering saws, the same tools are used today, with but few exceptions, that were used 50 years ago.

A TWISTED SAW.

A twisted saw of any kind is usually due to the metal being too long on the edge for the remainder of the saw. This is gener-



ally the result of long use or gumming, in either a solid or inserted tooth saw. This condition would sooner or later exist, provided the saw was not tensioned when it needed it.

The inserted tooth saw will run much longer than the solid, but if properly hammered neither a solid tooth or inserted tooth saw will let down soon.

It is interesting to note the difference of opinion that exists between good saw men about a twist in a saw; in fact a twist or wind in a saw, caused as stated, is really no twist at all, yet the saw assumes a twist, and by rolling it on the edge the twist will show on opposite sdes, as shown in cut, fig 9. Nos. 1 and 2 will show it to be high on the other side, while Nos. 3 and 4 show it high on this side. A and B show a straight-edge applied at right-angles; A shows a high place; that is it will rock while B will show straight, or rather light. If this is a twisted saw, caused by being jammed, kinked or hammered into shape, and it has some tension, then the long face hammer must be used in the direction of the long marks—that is straight with the straightest way of the saw, and never across the ridge as shown at A. As simple as this is, it is hard for some men to understand.

Never attempt to hammer a twisted saw with the long face hammer until you get some tension in it. Many such saws as No. 9 are ruined with the long face hammer, when they, in fact, only needed tensioning with the round, or dog head, hammer.

To correct such a saw, it is necessary to begin about half way from eye to rim, keeping a little nearer the eye, and work both sides a dozen or two times, until the blade begins to straighten up, and when it shows some tension it will likely show no twists or ridges at all.

The utmost care must be exercised in working such a saw, or the tension will be gotten in the wrong place. When the saw shows some signs of stiffening up, the straight-edge should be applied to determine whether it is resembling a No. 1 or No. 2 saw, as described in April and May issues of Dixie.

I have seen men who were good hammerers on saw with about the proper tension, but when they got hold of a stiff saw (not a twisted saw) it was a different story. The A test is, of course, same as in Fig. 1. He begins near the eye to "open it up," not paying any attention whatever to the B test, and the saw in consequence, is ruined—or rather put into such shape that it requires an expert to correct it.

It is possible for a stiff saw with no tension to be either a No. 1 or No. 2. A little reflection will show this to be a fact. After the saw has been tensioned with straight-edge or guage it may show some small ridges, as shown in No. 10. Nos. 1 and 2 show small ridges found with No. 12 straight-edge while the saw is hanging on the hook. Nos. 3-3 show a ridge clear across the saw, extending as shown. This is easily remedied by hammering as shown, hammering but little half-way, and very little more near the collar and across it, taking care to do the most ham-

mering near the rim, but not usually coming nearer than two inches of the throats of the teeth.

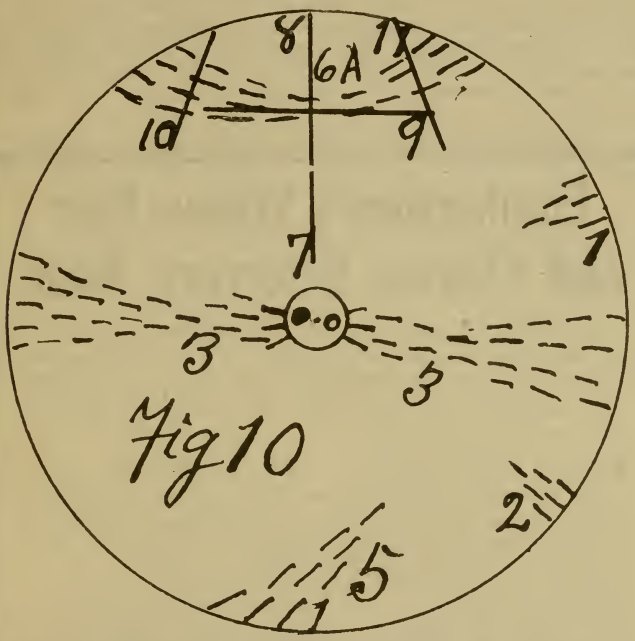


Fig 10

If this is properly done the tension will not be changed in the saw, neither will it change the tension in removing places like Nos. 1 and 2. Nos. 5 and 6 show ridges or twists caused by the saw being bent over or jammed while not running, as in the case of the carriage running a log onto the saw while it is not in motion; they are removed as described above.

No. 6-A shows a portion of the rim cupped or bent over; when straight-edge is applied at No. 7 from eye to rim it will fit the saw very well until near the rim when it will stand off as at No. 8. To apply the straight-edge as at No. 9 will show it nearly straight while Nos. 10 and 11 show quite high.

It is well to use a block or padded anvil until such a place is nearly removed; then use an anvil.

Ridges are not located under the drop test and while they are easily removed there are few filers who can properly hammer a twisted saw or keep ridges out of their saws.

To test a man's ability take him a cross-cut saw that a tree has fallen on bending or twisting it and get him to make it run as well as before the accident. If he can do it then he knows

more about a saw than one in a hundred of the experts and professors; bear this in mind.

Any saw must have some tension in it before twists can be properly and permanently removed; and as stated when this amount of tension is put, nine times out of ten the twists will disappear.

My next article will cover my experience with obstinate or bad cases.

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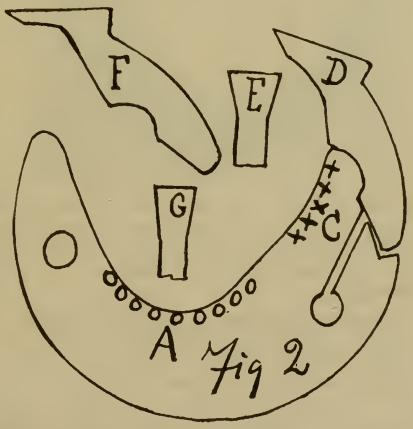
INSERTED TOOTH SAWS.

New saws from the shop do not always get fair treatment. Sometimes the maker is to blame for saw not running well, but there are mill men who can do more towards running a saw than the maker. The lead is an important thing to look after. An old saw may be running very well, and when a new saw is put on it won't go. No one thinks it is the lead, when the truth may be the lead is badly out, and suits the condition of the old saw, and the new saw won't run. Consequently, the mill man writes the saw maker his saw won't go—and to prove it refers to his old saw doing fine work, only it is too small. Where is the trouble? The old saw would not run well unless it ran hot or warm in the eye; the mandrel had lead to suit this saw to give it the necessary heat in the center, which the new saw would not stand, though they gave the order for a warm mandrel. There is quite a difference between a warm mandrel and a hot centered saw. Too much lead will ruin a new saw quick, while, as stated, a stiff saw needing hammering runs very well with too much lead.



A new saw that is too open (that has too much tension) will run out on the side of the log, heating the center, and making matters worse. This saw will incline into the log after the center is passed, or when log is squared up. The best remedy is to take the holders out and center punch them, as shown in Figure 2 at "A." This must be done with holder out of the saw; otherwise, it will not have the desired effect. After holders are expanded, as shown, on both sides, the saw will have less tension; will be stiffer, and will run better. When teeth do not

go in as tight as they should, the upper part of the holder should be in like manner expanded, as shown at "C." After holder is expanded, and there is trouble in getting it into its place, simply tap it with a hammer, pulling at the same time on the wrench. When holders are already very tight, then expand only at "C," which will in like manner, expand the rim.

Tooth "D" shows the usual style of tooth; "E" shows the back. "F" is the proper shape tooth, and will cut 20 per cent. lighter than "D." It shows less set than "E," and yet it has more wearing surface, and will save considerable in files. The saw makers claim that "G" has not clearance enough, while it has more than "E," and will cut, as stated, 20 per cent. lighter, and longer without filing. Try it and be convinced. Grind out your teeth like "F," and reduce the set as at "G," and note the result. It is a mistake that an inserted tooth pulls lighter than a solid, but they will run lighter than the average solid with proper shaped teeth. "F" will not break out. What breaks out teeth is, first, not a sufficient number for the feed; second, teeth not set into the plate at the proper angle. Put a straight-edge on back of tooth, and if the point of the next tooth is over ¼ inch lower on a 56-inch saw, and saw is crowded, look out for broken teeth. On 48-inch to 52-inch saws, ⅛ inch full is plenty; on 60-inch saws ¼ inch full will be right. If saws have a good number of teeth, then the above clearance is too much. An inserted tooth must cut directly against the point, and must not scrape, and when a new set of teeth is put in, tap the edge down a little with a smooth face hammer; that is, turn the edge of the teeth down, or in, a little. This will keep the teeth from breaking out, and will add much to the life of it. The first filing should just remove what is left of this turned-in edge.

The ball of the holder is at "C," and must cause teeth to go in tight, or they will break (or are liable to) and should be kept tight. "F" is too slim for frozen timber, but when worn about ½ out is a splendid tooth. Use only round edge files on an inserted tooth saw.

TEETH SETTING TO ONE SIDE.

If holders are not kept tight, this trouble begins early with a new saw. They always set or lean from the log, which makes it very difficult to get good results. I have saws sent me for hammering, when the greatest trouble was in teeth setting, as shown at "B," Fig. 1. This sketch shows the back of a right-hand saw; dotted lines "B. C." show how much the tooth sets out of plumb or out of the log. I have not yet found a man who could determine this trouble, but many have resorted to bending the saw heel at "D," only to ruin the saw. The whole trouble is in the holder; the ball or bearing "A," soon gets out of square by this constant side pressure on the teeth while the log is gigging. If saws were filed oftener and not allowed to rub the log, then there would be but little of this trouble. This

side pressure wears the ball of the holder out of square, as shown at "E" (which is a top view of "A"), the log side being the shortest.

The remedy is to dress the ball of holder square, as shown by dotted lines; then tighten the holder, as previously stated, and teeth will set straight in saw.

In some cases, I have seen the V in the saw worn to one side, in which case it must be dressed off to be equal and in the center of the saw.

These little details seem to amount to nothing, and so they do to the average man, but who would succeed and make more money, will gladly look into and watch these important points.

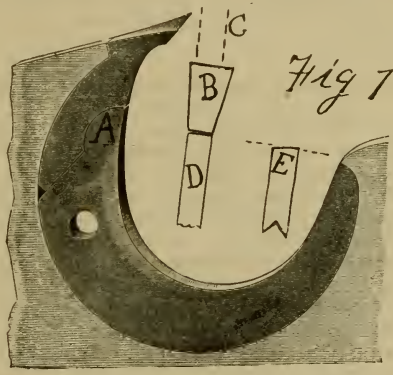


Fig 1

Again, some holders are expanded too much at "A," Fig. 2, making the holder larger than the circle in saw, resulting in holder setting to one side, which is caused by the bottom of holder not fitting down into the V in the saw.

Holders that set to one side will cause a saw to run one way or the other, for this reason: Teeth often are changed when much more service could be had. Loose holders will cause tooth and holder to fly out in knots, where, if the holder and tooth were tight, only a portion of the tooth might break out, the holder remaining in the saw.

If a saw is crowded beyond its limit, or the speed should slow down to a drag, then look out for an occasional broken tooth.

Those contemplating buying an inserted tooth saw will do well to get the right number of teeth for the work required, for any saw that loses teeth will soon be ruined by the heel of the saw being injured. Holders will, in time, become worn so that the dust will not all be taken out, with the result that the saw heats on the run, and as there are many kinds of wood of varying hardness, mill men are perplexed, for, on certain logs, the

saw runs poorly and heats on the run, while the softer logs are cut very nicely. This is the beginning of trouble; the holders may be removed and ground square, then expanded and replaced, and this will give temporary relief, although a new set of holders should be had. This trouble is often had in frozen timber. If the saw has been doing nice work, and begins to run badly, there are but two conclusions to be reached, i. e.: it either needs hammering or a new set of holders.

In putting in a new set of teeth, be sure and oil the teeth, and if smooth work is wanted, it is best to side file lightly, then under file, so as to make the point the widest part of the teeth. Some successful sawyers joint their saw a little when new teeth are put in; this is an excellent idea, and should be practiced on any saw, for the saw may be perfect and round—yet the variation in teeth, and the fitting of the stem of the mandrel, will throw a saw more or less out of round.

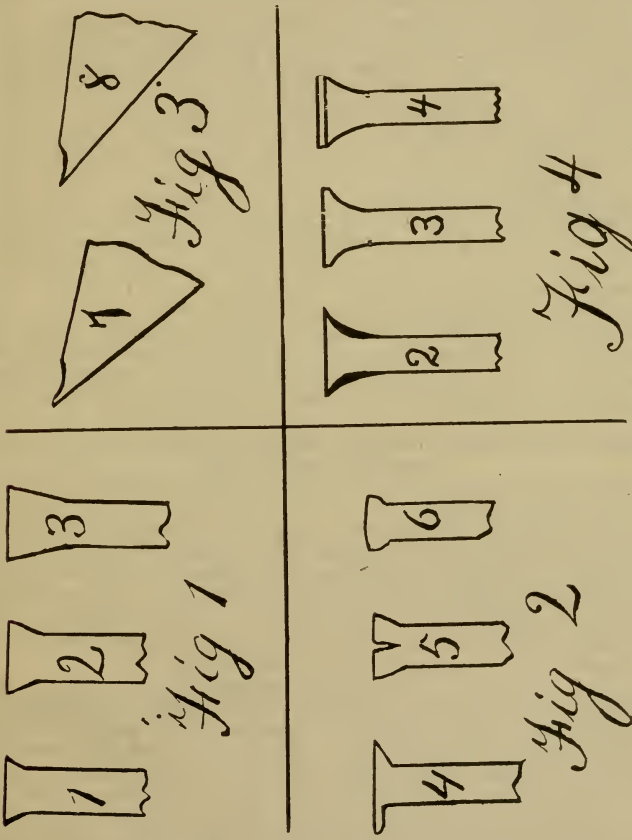
The Solid Saw—How it Should Be Swaged and the Teeth Kept in Order.

A saw kept round, properly swaged, will come nearer making good lumber than all the hammering that can be put into it. This part of the work on a saw is very easily done if the operator will apply himself and use some judgment. It is true that at times mechanics, in all lines, do not apply themselves as in former days. Probably this is due to the prosperous times our Southern country has enjoyed for the past few years.

A saw to swage well, must have uniform shaped teeth, and must not be too thin at the point. Many good saws are condemned by too thin a tooth, with little hook, while another man is running as thin a tooth with more hook, having no trouble. Figures 1, 2, 3 and 4 show various points of teeth swaged. At a glance, anyone can see that Fig. 1 and 4 are properly swaged. Fig. 4 shows work done by the eccentric swage; 2 and 3 show front and back views. Number 4 shows the front of tooth ready to run, and illustrates that a light stroke of the file finishes it. If small mills would put in from six to ten more teeth in their saw, and use this swage filed as at 4, and would keep the plate in order their bank account would be several hundred dollars ahead at the end of the year.

For heavy feed in our hard pitch pine, the Kinney, or similar swage, is the best. Figure 3 shows its work. The work is done on the top instead of on the front. Fast mills must have from eighty to ninetl, and some one hundred teeth in saws. To keep the proper shape to teeth, the swaging must be done on the top. A thin point, like 4 in Fig. 4, will not stand the heaviest feed. I know some will dispute this, but they do not run saws on 8-inch to 16-inch feed. Eight shows that the swaging must be done right to the end of the tooth. When this style of swage is working right, it will mash the center of the tooth at the extreme end to a very thin edge, so thin that a pressure of the

thumb nail will turn it. If it does not swage right down to the point, as at 7, the tooth will crack or split, as shown at 5 in Fig. 2. If saw is soft, then it may not split, but no filer in fast mill wants a soft saw. He wants a medium tough temper. Three in Fig. 1 shows the front of the tooth 8, but 2 shows the general style of swage from the upper swage. Number 1 shows a light corner, such as is made with the ordinary upset. It is a very good corner for light feed.



Few men can use the upset successfully, and yet it is more universally used than any other. If a saw is allowed to run too long without swaging, as shown at 6, the teeth will likely split,

similar to 5. If mill men and filers would keep their saws round, and swage a little, and that frequently, they would get better results from the use of the upset swage.

I receive saws for repair with teeth like 4 in Fig. 2. This tooth is no exaggeration, and of course about half the corners were off, and saw ¼-inch out of round. There ought to be a law passed to prevent some men from attempting to butcher up our timber. A saw in such a condition as this, will never make a dollar for its owner.

How much set is necessary is often asked. From four to five gauges of set is ample if plate is true, and has not been hammered full of bumps. When this is the case, from five to six gauges is necessary for the uneven blade to clear. On an 8-gauge saw, five gauges of set measure exactly ¼-inch. This is the limit on an even, smooth plate, it will run down to four gauge; that is, ordinarily it can be filed two or three times before needing swaging.

A 10-gauge saw should not have but 3-16-inch swage, while the average band saw cuts 5-32, there being but 1-32 in favor of the band. A 64-inch or 66-inch 10-gauge saw, properly hammered, with good power, will cut as much hardwood as the average band saw.

Any saw will do only poor work with too much set. Some men run more than is necessary, while, as stated, others are compelled to run more than they want, owing to the poor condition of the saw. The teeth shown in Fig. 4 are not side dressed and show too much set. 1, 2 and 3 in Fig. 1 show proper set.

Sawing Logs to Best Advantage and How to Get Straight Lumber From a Crooked Log.

The sawyer is the most important man in the mill, and next to him comes the filer.

To get all possible out of a log, to the best advantage; to overcome defects, and to make the product in the least time requires a first-class sawyer, and one man at a large salary is often times considerably cheaper than another who would give his services gratis.

Good judgment must be exercised and he must have a good mechanical eye to produce the best results.

In the sawing of a crooked log, there are several points to be considered: first, if it is not placed right on the carriage there is a loss in the cutting, and at the same time it is possible that the lumber made from the log may be rendered useless on account of it springing so badly. Supposing that 2x4s or 2x6s are to be made; the bow, or belly, should be set directly up or down on the first line, that is the first line must be as near as possible the straightest way of the log. Turn the first side directly against the knee, then turn down and take off two inches for the edger. This will be making the largest dimension of the lumber the straightest way of the log, and the lumber will not then be

springy on its working edges, although it will spring some sidewise.

There is no use to tell a millman that a crooked log will not spring. Suppose the bow is set against the knees, or directly out, so that the first line the saw cuts off will be a belly slab instead of a straight one, as I have stated; with two-inch stuff from this log to the edger it will pinch and burn the saw, and when it is finally gotten through it comes out in bow shape, with the front end of a 2x4 often a little over 3½, for as often as the piece is backed out the saws cut out another kerf, owing to the pinching or closing up of the ends.

If this lumber is intended for rafters, joists or studding (which it is used for) it is very difficult to work, unless cut true, for it will make an irregular or bulged floor, ceiling or roof, the bowed lumber making it often times necessary to saw into the concave edge and drive in wedges to straighten it.

If logs are to be cut into 1x10 or 1x12 there will not be much springing edgewise, but the log is sawn to much better advantage by the crook being turned directly up or down when placed on the carriage.

In sawing defective logs, the sawyer must be on the alert, being careful to turn a shake so as to "bottle it in" if for timbers; if inch boards are being cut, and the shake is turned right, one board will usually take it out, or otherwise a half dozen boards or other sizes may be ruined.

It is best to saw a log with the butt end first, especially if cutting cants or slabbing for a gang, for the "shims" will not hang between the saws, whereas if the butt end was behind they would hang badly.

Sometime ago the author was in a mill when they were sawing car sills from logs that were very crooked, and many of them would not have made a 6x6, but the sawyer was getting 5x9 sills out of them. The carriage had good "boss" dogs, and by using the taper lever the log was actually sprung to an almost straight position. The sills sprung considerably after being sawn, but the sawyer was "onto his job" and the spring was mostly sidewise instead of edgewise. The sills were well sawn and of even thickness.

IN SAWING CANTS FOR A GANG, MAKING EDGE GRAIN OR RIFT FLOORING, the best results and the greatest per cent. of rift is made by first taking off a slab, then a board and next a flooring cant; then turn the log down and continue the same method on all four sides. If you are sawing a large log a 12x12 will be left in center. This can be reduced to an 8x8, which may be sent to the gang or converted into a sill or railroad crosstie. With this style of cutting rift, hardly three-quarters is full rift, but considering that time must be saved, the above plan will prove the most satisfactory.

There are several styles of rift machines now on the market, or to be put on the market, that are designed to take the place of the pony gang, and some of them promise to be a success.

HOW OPEN A SAW SHOULD BE FOR VARIOUS SPEEDS

Good judgment must be exercised or you will be deceived. Do not conclude that a saw is opened properly for speed until you have applied the test. A saw similar to sheet No. 1 would not appear near as open as sheet No. 2, and yet both saws be opened for same speed. I only use No. 1 and 2 as an illustration. You want to get the drop right, for what I give here applies to a saw hammered right, and do not let any one deceive or contradict this, for I have given it years of test. I will take a 60" saw at 800 speed. This being about the standard for fast mills. Some mills run 60" 950. A 60" for 800 cold mandre should lean to an angle of 45 degrees; that is, lean half way to the floor from a perpendicular before center drops. For 700 it should lean about 18". For 600 it should dish through at a slight lean, say 4". For 500 it should have a loose center, but by no means should it dish; it should stand straight on floor; for warm mandrel from 2 to 4" less lean of saw For smaller saws at same speed, say 56" for 800, should lea about 24" before center drops through. For heavy feed, say 10 to 12", I would recommend more opening than given above. For lighter power less opening than I have given. It is poor policy to run a saw at high speed with limited power; better change pulleys and slow the saw down if you want to make uniform lumber. With this description of how open a saw should be, with a description of how a saw will act when at work, with too much and with not sufficient tension, I do not think you can be mistaken. **Remember, this applies to a saw properly hammered.** Again I must emphasize the use of good judgment. Light power requires less opening. A 50" saw at 400, 8x9 warm mandrel, must be stiff, that is the center not shake or tremble; such a saw under A would rock, while under B a little light. Take a 60" saw at 900, with 500 ao 600 H. P., and it should be laid flat or in a horizontal position before it will dish.

If mandrel runs hot give less tension and hammer saw as in sheet No. 3. The above is often deviated from. I have seen stiff saws run at a fairly high speed, but the bearing next the saw ran boiling hot. Such a saw would snake in starting up, until heat was applied near the collar.

HOW THE RIM OF A SAW SHOULD BE

It is not necessary to argue how the rim should be or anything about the various theories advanced by practical filers and saw-makers. We know that the tension must begin near the rim.

HANCHETT SWAGE WORKS

BIG RAPIDS, MICH.

PROPRIETORS AND
MANUFACTURERS OF

Hanchett's Adjustable Saw Swage

AND A COMPLETE
LINE OF . . . .

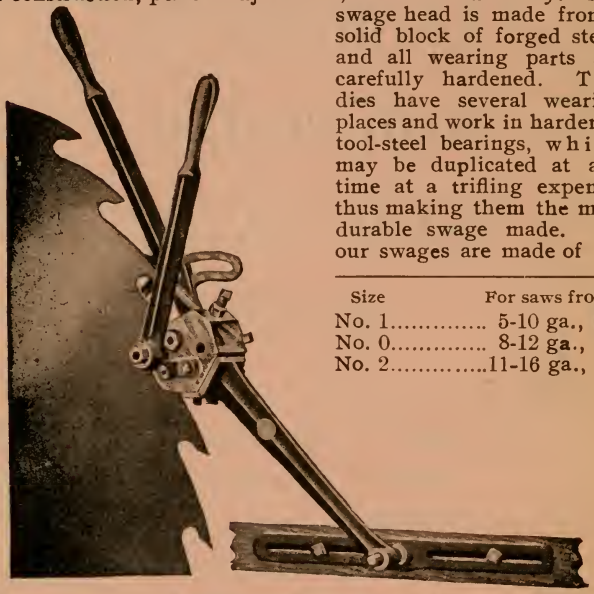
Filing Room Outfits
Automatic Band Saw Sharpeners
Automatic Rip and Cross-Cut
Circular Saw Sharpeners,
Automatic Lap Grinders
Band Saw Stretchers
All Kinds Saw Tools.

NOTE:

The seven pages following are of interest to every Saw Filer in the country, and we would request that you take occasion to read it over and acquaint yourself with the merits of our Tools . . . . . .

The HANCHETT Adjustable Saw Swage

THE Hanchett Adjustable Saw Swage is an efficient eccentric die swage. They are noted for their great speed and easy operation; the excellent work which they do, simplicity of construction, perfect adjustment, and their durability. The swage head is made from a solid block of forged steel, and all wearing parts are carefully hardened. The dies have several wearing places and work in hardened tool-steel bearings, which may be duplicated at any time at a trifling expense, thus making them the most durable swage made. All our swages are made of the



HANCHETT CIRCULAR SAW SWAGE.

Size	For saws from
No. 1.....	5-10 ga., $35
No. 0.....	8-12 ga., 35
No. 2.....	11-16 ga., 33

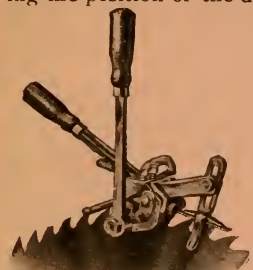
best material it is possible for us to procure. The dies and clamp screws are made of the finest tool-steel, and are carefully tempered. The levers and other parts are made of malleable iron and steel, and are nicely polished and nickel-plated. They are compact, solid and strong. They will not spring or move ahead on the saw, but will stay right where they are clamped. They are not complicated; while they have all necessary attachments they have no unnecessary ones. The slotted adjustment which holds the die and is connected to the die lever is a very

Hanchett Swage Works, Big Rapids, Mich.
Manufacturers Complete Filing Room Outfits.

handy arrangement. If it is necessary to adjust the die for more or less swaging, it can be done to a hair's breadth without changing the position of the lever, or the filer can adjust the lever to any position most convenient for him, without disturbing the position of the die. The shape of the anvil also makes it very easy to dress, which is a very important point in keeping any swage in perfect working order.

By the action of the dies the teeth are drawn out, which refines the steel, causing the saw to carry a better cutting edge, thus increasing the life of

Size.	For Saws	
No. 1.....	5-10 ga.....	$35
No. 0.....	8-12 ga.....	35
No. 2.....	11-16 ga.....	33



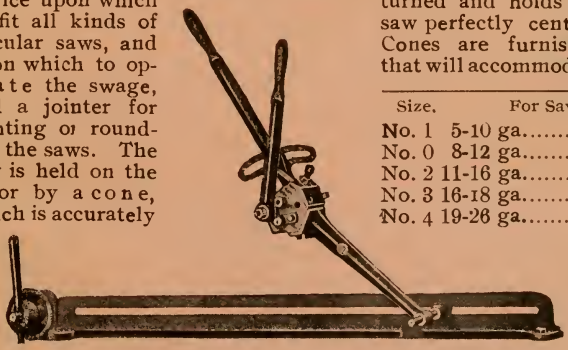
Hanchett Circular Swage for Swaging Saw on Arbor.

the saw. The tooth is drawn out widest on face—widest at extreme points, and makes very strong corners.

We guarantee all our swages to be satisfactory. If not found so they may be returned at our expense. A trial will cost you nothing.

There has always been a demand for saw-fitting attachments, and to satisfy this demand we have placed upon the market our swage, with the following attachments: A long bench attachment, or casting of malleable iron, which makes a very handy device upon which to fit all kinds of circular saws, and upon which to operate the swage, and a jointer for jointing or rounding the saws. The saw is held on the arbor by a cone, which is accurately turned and holds the saw perfectly central. Cones are furnished that will accommodate

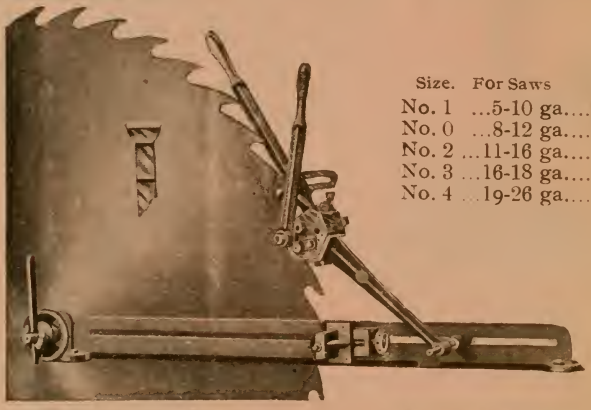
Size.	For Saws	
No. 1	5-10 ga.....	$38
No. 0	8-12 ga.....	38
No. 2	11-16 ga.....	35
No. 3	16-18 ga.....	30
No. 4	19-26 ga.....	30



Hanchett Circular Swage, with Bench Attachment.

arbor holes of any desired size. The swage held in position relative to the saw by a pin which slides along the slot in the

casting. The jointing is done by a piece of the ordinary mill file, held firmly in place by set screws and adjusted by a hand wheel. It is a simple machine, practically impossible to get out of order, and is just what every filer wants to use every day. We have sold a great number of this style, and we have yet to hear of a complaint.



Size.	For Saws	
No. 1	...5-10 ga....	$42
No. 0	...8-12 ga....	42
No. 2	...11-16 ga....	38
No. 3	...16-18 ga....	35
No. 4	...19-26 ga....	35

Hanchett Circular Swage, with Bench Attachment and Jointer.

The HANCHETT
Band Saw Swage

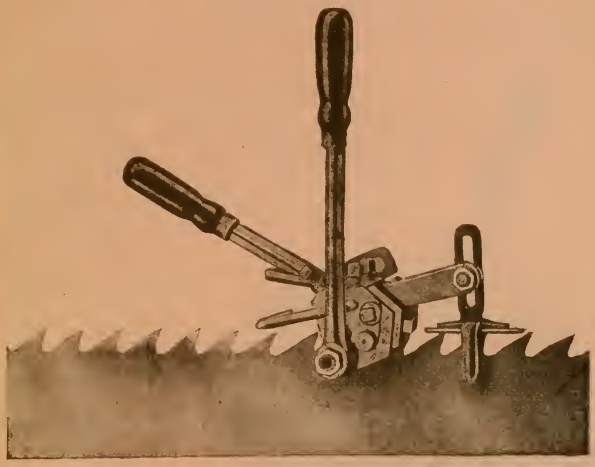
This style is designed especially for use on band, band resaw and gang saws.

When used upon a gang saw a fork is furnished that has no forward projection, thus making it more convenient for swaging the last teeth at lower end of the saw.

We wish to call special attention of factory men and all users of small band resaws to Nos. 2 and 3, which are especially adapted for saws ranging from 16 to 26 gage. The swaging of these small resaws is a very delicate and important process. The swaging may be done by the use of the up-set or spring set, but filers find the band resaw swage much superior to either. It draws the teeth out widest on the face—widest at the extreme

Hanchett Swage Works, Big Rapids, Mich.
Manufacturers Automatic Rip and Cross Cut
Circular Saw Sharpeners.

points, and makes exceptionally strong corners. They may be used upon teeth ¼ inch long or 'onger. It is adapted to all ordinary shape of teeth and gives sufficient swage without the use of the upset. The Hanchett Band Swage is noted for its great speed, ease of operation and the excellent work which it



Hanchett Band Saw Swage.

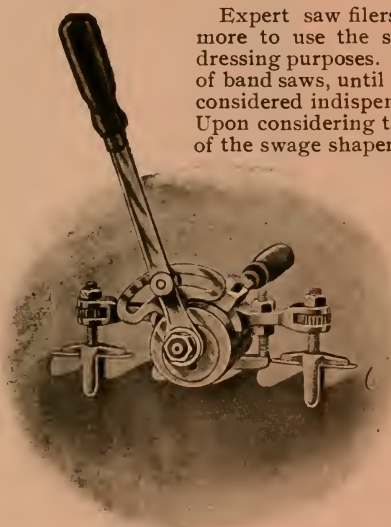
does. We are always glad to send them out on approval, guaranteed to be entirely satisfactory. If not found so they may be returned at our expense. A trial will cost you nothing.

PRICES.

Size.	For Saws	
No. 0	8-13 ga	$35
No. 1	12-16 ga	35
No. 3	16-18 ga	28
No. 2	19-26 ga	28

Hanchett Swage Works, Big Rapids, Mich.
Manufacturers of All Kinds of Saw Tools.

The HANCHETT
Swage Shaper



Expert saw filers are coming more and more to use the swage shaper for side dressing purposes. This is especially true of band saws, until now a swage shaper is considered indispensable for fitting them. Upon considering the very successful use of the swage shaper upon band, band resaw and gang saws, has led us to place upon the market a similar tool for side dressing log, shingle and small circular saws. The side dressing of saws has much to do with the successful cutting of good, straight, smooth lumber.

Hanchett Band Swage Shaper.

The Hanchett Swage Shaper completes the work of the saw swage, and presses every tooth to a perfect shape, as in a mold, widest on face—widest at extreme points, thus making an ideal shape and a perfect clearance. This is accomplished by a pair of hardened tool-steel dies, one upon each side of the

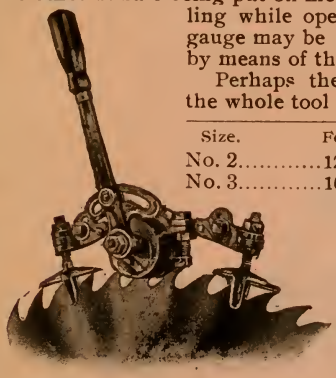
PRICES.

Size.	For Saws	
No. 1	8-13 ga.	$25
No. 2	12-18 ga.	20
No. 3	16-22 ga.	20

Hanchett Swage Works, Big Rapids, Mich.
Manufacturers Complete Filing Room Outfits.

tooth, which presses it to any desired gauge. The dies are accurately ground and beveled in two ways, so as to taper the saw tooth downward from the point and backward from the face. The dies are set in plugs which are forced together by a screw running through them, having a right-hand thread upon one end and a left-hand thread upon the other. The dies may be easily removed from the plugs by means of a punch, and reground at any time by the filer. They have several wearing places and require no gauge to regrind them, simply an ordinary emery wheel. All our swage shapers are made of the best material it is possible to procure. The head is made from a solid block of steel, hence no loosening and slipping of bolts and nuts. It is bored accurately to accommodate the easy working of the plugs, which are also made of a fine grade of steel. The levers and other parts are made of malleable iron and steel and are nicely polished and nickel-plated.

They are compact, solid and strong, and are noted for their great speed and ease of operation, the excellent work which th y do, simplicity of construction, perfect adjustment, and their durability. The slotted circle with which the dies are connected to the lever is a very handy arrangement. The operator can adjust the lever to any position most convenient for him to operate; or if he wishes to change the spreading of the dies, even to a hair's breadth, he can do so without disturbing the position of the lever. The shaping is done by one lever, the other handle being put on merely for convenience in handling while operating. Adjustment to any gauge may be quickly and accurately made by means of the knurled nuts.



Combination Shaper for both Band and Circular Saws.

Perhaps the most distinctive feature of the whole tool is the tooth-stop. It makes every tooth take the same position on the dies. Hence every tooth must be shaped exactly alike, therefore every tooth must do the same amount of work. This suggests an easy running saw, smoother and better lumber and less power to run it. The great speed with which the Hanchett Swage Shaper is operated is due chiefly to the form of this tooth-stop.

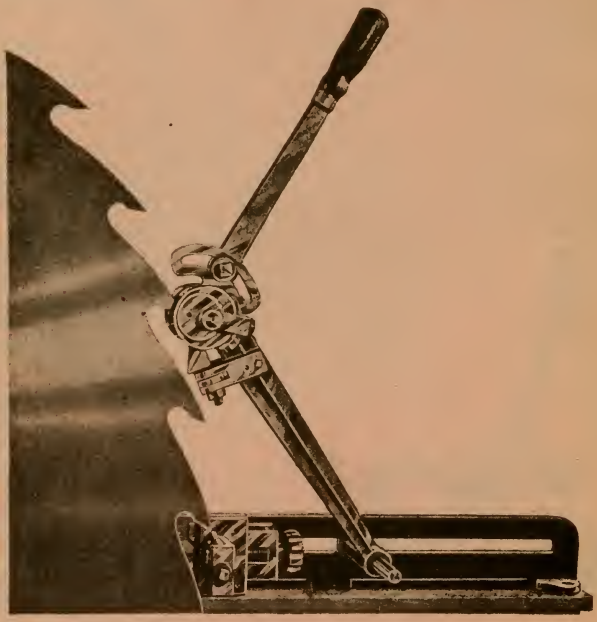
Size.	For Saws	
No. 2	12-18 ga	$20
No. 3	16-22 ga	20

Hanchett Swage Works, Big Rapids, Mich.
Manufacturers Automatic Band Saw Sharpeners.

Another handy arrangement which appeals to every filer and practical mill man is the way in which the Swage Shaper is used upon the circular saw. The shaper being attached to a standard and the standard fitted to a pin in the same manner as a circular saw swage is used upon a saw. When the shaper is to be used the saw swage is removed from the pin and the shaper placed thereon.

The Hanchett Swage Shapers are extremely rapid to operate; they will dress from 30 to 40 teeth per minute on circular saws, and from 60 to 75 teeth per minute on band saws.

We are always glad to send our swage shapers on approval, guaranteed to please and to be entirely satisfactory in every respect. If not found so, return them to us at our expense. A trial will cost you nothing.



Hanchett Circular Swage Shaper.

PRICES.

Size	For Saws	
No. 1	5-13 ga	$25
No. 2	12-18 ga	20
No. 3	16-22 ga	20

Hanchett Swage Works, Big Rapids, Mich.
Manufacturers of All Kinds of Saw Tools.

Knowing this, there are many who carry the drop or opening out to the rim or nearly so. **This is wrong.** Under the drop test (remember I give and neither do I recommend any other than the drop test), you must hae a portion of your rim flat. Reason it out. You have your saw supported on a line directly across the eye; the rim where you apply the test is overhanging the bearing or supports that hold the saw. Now, is it not theory that the rim tends to hang down a little? You apply your 6" straightedge on a line of the supports of the saw, and the rim drops right up to the teeth, while at right angles to the supports you have a portion of the rim flat.

HOW MUCH OF THE RIM SHOULD THERE BE FLAT?

This depends upon the speed of saws. A 56" saw at 900 should have 5" of rim flat, for 800 6", for 700 7", for 600 8". For a 60" saw at 900 5" of rim must be flat. All saws, at the standard speed given, should have about 7" of rim flat. Then the drop begins there and increases, as stated in shee No. 3. The rim of saw is yet a puzzle to many good men and some sawmakers. If I were not in a mill cutting from 12 to 18 boards per minute on 12 to 14" feed, I would not be qualified to make this assertion. The above can be deviated fro ma little and saw make good lumber, but where the tension is extended nearer the rim or near the eye, there will be a change noted in the running of saw. **Be very careful and keep the rim flat;** any full places on this part of the rim will make a saw run badly. I have seen good men lose their position by using a 12" straightedge on rim instead of 6 or 8". The 12" not showing the full spots near the rim that the shorter would. This was on a fairly nigh speed saw. When the rim of a saw down 8 to 12" does not wear bright and uniform, it is not right, but has tight places, as stated above. Do not hammer nearer the rim than 2" unless it is a No. 1 saw.

SAWS TURNING OVER THE COLLAR.

This is caused by too much lead, or saw too open around collar, like No. 2. Saws will never break if lead is kept right. Of course it must be hammered right. If saw wears bright right down to collar, it is a sure sign of too much lead.

HOW GUIDE AND MANDREL SHOULD BE.

Guide must be as high up as possible. Run a short pin on log side and raise guide until blocks will just clear. A difference of 1" in a guide will make 10% better running saw. Try it. Mandrel must be set so that top of blocks will be 1" above collar on small mills and 2" above on fast mills. I admit it takes a little off the saw, but here is another important point often overlooked. I emphasize that you watch all these points. It means your success where others have failed.

THE LEAD OF A SAW.

A straight gauge saw on a good mandrel with good carriage and track requires but little lead; one-thirty-second in width of saw is ample. A simple way of testing the lead is to slack both guide pins while saw is in full motion. Hold a small stick firmly on headblock. Now move carriage up; let saw tip the end of it and when the back of saw is reached it should just clear. This is simple, quick and infallible, provided track is straight and no end motion to carriage trucks or track. In setting a mandrel the best plan is two ines drawn at right angles. Set the mandrel square with track and give the necessary lead when ready to start up. Try your lead occasionally; it is astonishing how a good saw will run with the lead badly out. Don't conclude that as it was set right a few months back that it is yet so. It will often change from unaccountable ways. A saw should not be forced with the guide as much as 1-16"; 1-32" is allowed; that is, move the guide 1-32" from a straight line with collar. It is **of the utmost importance** when saws are changed to see that guide is on a line with face of collar. A 30 to 36" straightedge should be handy to apply on face of collar when changing saws. Any good carpenter can make one from a dry piece of 1x3, if he has a good true-faced foreplane. **Another way:** use a tram, and let thes aw be the tram. Mark a tooth at the guide (both pins being free) measure from block to this tooth, now turn your saw ½ back and measure at same tooth; there should be 1-32" to 1-64" difference. The saw acts as a tram. Be sure slack in carriage and block is forced one way and you will get it correct. In this way any noon hour it can be tested.

DOES YOUR CARRIAGE RUN ON A STRAIGHT LINE?

Your track may be as straight as a line and yet carriage vary to and from the saw. It is not an uncommon thing to find 1-4 variation caused from side motion in carriage, wear in the grooved trucks or from a sprung axle. The latter is often the cause of much trouble.

How to test this. Draw a line above your carriage directly over your grooved track. If your wheels are flanged, get the exact center between the rails, either measurement can be obtained accurately with a good lumb-bob. Now hold a rule or secure a stick to carriage that will just clear this line and mvoe carriage up and down the track and you will be surprised at how much your carriage varies, and all this is against your saw, as saws are not made for side strain. Get your measurements accurately and you will have it to 1-32". As much as 1-8" out will not allow a band saw to run, and I have seen circulars doing good work 3-8" out.

HOW COLLARS SHOULD BE AND HOW TO TURN THEM IN PLACE.

This is important. Most of the small mills have cast collars and if saws have been abused and broken on them they are surely out. Apply an accurate 8" straightedge and you will see that the outer edge of the collar does not hold the saw. This causes the loose collar (which seldom gets out) to tend to force the saw over. This is not all. Such collars are out of true and cause the saw to wobble. Turn it off right where it is. Run engine as slow as possible, having taken out all end play, take an old 14 to 18" file and break the end as near a diamond shape as possible and grind to sharp point without heating it. Rig a good wooden rest; remove lug pins and let rest be close to collar and solid. Begin now and mark the face of collar where saw binds, as though you were cutting a fine thread. This is the only way that any one can get it true. After marking face all over, except near outer edge, have another file ready with end square and ground straight. Use this to face off with. You should leave about 3-4" flat and the remainder concaved 1-32". If the square tool is held in right position you will do a better job than half of the machine shops. Do not undertake to scrape it off true before using the diamond point or you will ruin your collar by it gouging into it. Make the fine marks with diamond point, using judgment as to how deep to go, and with square tool scrape but little. Hold both tools steady, which is easily done with a long handle. The loose collar should be about same as the fast collar. Be sure that the metal is clear about the lug pins. This is too often overlooked.

WHAT CAUSES YOUR LUMBER TO BE OUT OF SQUARE.

The poor saw, sawyer and filer get lots that they are not entitled to. How often do we see hot-headed foremen or superintendents after them, when they ar not in the least to blame. I give the following, that they may show them the trouble and retain themselves. In the smaller mills the proprietor usually embraces all the above.

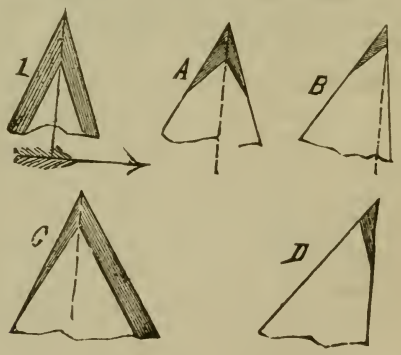
The side of a carriage next to the saw carries more weight, which causes everything from the track up to the face of the block to wear faster—the track, trucks, axles and face of block. The latter with steel face is of but little importance. The down strain of the saw while cutting causes some of this, and the track will usually be found lower near the saw than anywhere else, and when the level is applied to test this be sure that the head-block is at the guide, for if you try it with carriage back it might show to be level and be 1-4" out at the saw. When carriage is low next to saw no man can cut square timber. It may not show on anything smaller than 10", but timbers for export must be right, as all kinds should be. A good saw will not stand running out to make timbers square. Better level up head-block and saw mandrel.

MISTAKES MADE ABOUT THE NUMBER OF TEETH IN A SAW.

Saws usually do not have sufficient teeth, and yet they have in some cases too many for the shape they are in. I avdise to run all the hook you can, just so the back will clear. In this way you can run 15 teeth to every inch of feed in hard wood. Don't run a great big open throat; 3-4 to 7-8" throat is ample, and when you order an inserted tooth saw get No. 2½ or edger teeth for hard wood and our Southern pine. Then you can get more teeth. A 2" throat in a saw is absurd. By running more hook our saw will cut lighter and will cut a shaven or chip and will not scrape the dust out. Do not let any one tell you otherwise. I held to that no hook theory for ten years and have long since been converted. It works on all speeds, feeds and power with all the hook you can run. Your saw will last longer and will stay sharp longer. You can run a much thinner tooth, which will swage better.

CUT-OFF TRIMMER AND SLASHER SAWS.

The most abused and most neglected saws in the mills, consequently more broken. What breaks them is too little set, too dull and the work twisting and binding, or pinching the saws. In the accompanying cut the arrow shows the direction saw



is running. I is the general style of tooth, A shows a tooth where little filing is necessary, B shows the best tooth of all; the front is square beveled on the back, where the work cannot be snatched; this tooth will run twice as long as any other without filing. B is a reverse of D and is not any good. C is the practice of some and is only a tooth for lots of filing and poor service.

CRACKS IN CUT-OFF SAWS.

When you hear a saw making a thrilling noise, examine it carefully, and a gentle tap with a hammer will also tell if it is cracked. Drill a hole at extreme end of crack, and cracks arrested in this way before they get too far will not injure the saw. If in a hurry and can't drill it, do not run it, but center-punch the crack on each side and if it is a shallow crack, ½" to 1", it will run for some time before it extends.

Be very careful in punching a saw; if it is not solid the crack will extend while punching it; caused by vibration, that is, by blow not being solid.

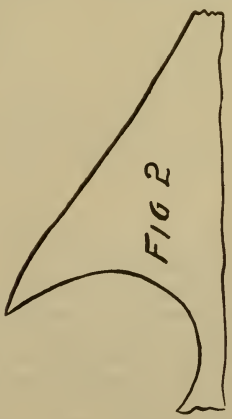
Saws that cannot be conveniently gotten to an anvil can be punched by backing a heavy hammer against it. A little precaution along this line will save many dollars in saw bills.

Be very careful that no hard scale or case hardened surface remains, or teeth will surely break in setting. To set a saw use the corner of your anvil, or your swage bar and a one pound hammer for 10-gauge saws.

A trained eye and a little practice will keep the proper set and will make smooth lumber, without gauging the teeth. If you have not a well trained eye, you need another vocation.

THE USE OF THE EMERY WHEEL.

Figures one, two and three show regular styles. Figure 2 shows a wasteful, reckless method which is practiced by many; it shows the back scooped or cut out too much. Such a saw will



wear out twice as quick as a tooth like Figure 1. Figure 3 is the best tooth for an automatic sharpener, it shows exact size of

tooth in a 60", 80 tooth saw. A is the swage for the heaviest feed. B is a good hardwood swage, also suitable for frozen timber, it has but little set.

Before gumming a saw it should be rounded up, then take the end of a file and make a circle the depth desired and gum to this line, making the back a nice uniform oval; as in Figure 1.

Figure 2 shows how much filing can be done before it needs gumming again. This tooth is the style for small mills having but one saw and wishing to run as long as possible without gumming.

For a saw to last it must be gummed as near back on the periphery or circular line as possible. Remember that large, wide gullets will not do, tooth must not be filed too much on back, or they will soon get too slim; besides, a tooth like Figure 2 cannot be run with much hook. Run all the hook you can, but be sure back clears.

Buy a good wheel or none at all; buy from a reliable dealer and tell him what wheel is to do, and if he should fail to send the right grade, don't use it, but write him; for he is honest and will send you what you want.

A wheel that has too clear a ring when you tap it, is too hard; a soft wheel has a dull sound. This test is made with wheel suspended on one of your fingers, not tight on a mandrel.

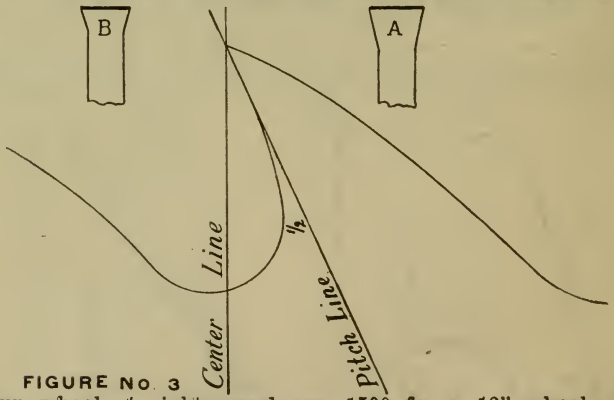


FIGURE No. 3

Run wheel at right speed, say 1500 for a 12" wheel. If it burns some run it slower, for it is too hard or too fine; if it makes more dust than sparks the speed is too slow or wheel is too soft. Hard wheels are not so liable to break, but a soft wheel will not stand much above 1500 for safety, unless mounted on a very steady mandrel, all wheels should be run on one, but more frequently not so. Keep wheel clean. About ½ dozen washers on the end of a bolt make a good cleaner. Above all things keep it true. Any wheel not properly used will get out

of round, and no one can do good work on it.

On the hand grinder saws should be sharpened, and no file used. This is in mills with a change of saws, and I venture the assertion that not one in 50 of these machines are used as they should be.

Don't buy wheels from every drummer that comes along, but get a good wheel and stick to it; always send the tag found on the wheel and you will get the same wheel.

Be very careful to remove all the glaze or hard scale that the wheel might leave, especially if it is a hard wheel or if it needs cleaning; it will cause cracks and also square corners of teeth to break. Watch these vital points.

BAND LOG SAWS.

In these instructions I will give a rather brief, but practical, treatice, and will not go into the primary teaching, for it is out of the question for an inexperienced man to learn completely from any book. **Practice** with the proper **theory** is what is wanted. A good circular filer will have no trouble in mastering the band. Those who would learn band filing should get into a file room as a helper and work up; then buy what books he can get, read all he can and do not get fixed on any one theory or plan; It is astonishing the differentmethods of fitting band saws.

As Much in the Sawyer as in the File.

Some sawyers cannot run any kind of a saw and often good filers are imposed upon and let out by some reckless fool of sawyer who will "hit them" too hard, feed by jerks, and does not know enough about timber to feed the saw right. They will feed as fast in a hard log as in a soft one. Let me say that in all classes of timber it varies; the butt end is the toughest and the smaller the log, the tougher it is in any wood.

There Ought to be a Treatise for Sawyers.

Sawyers should keep the guide pins adjusted, the filer changing them when necessary. The filer is not expected to be there at every change of saws.

The Carriage and Track.

The carriage and track play a most important part; good true lumber is what is wanted and no saw will make it unless carriage and track are in line. Those sawyers that pound the carriage with the steam nigger never make good lumber. They knock track and off-set out of line and keep loose motion or end-play in tracks, all of which makes bad lumber. All may be lined up nicely today and knocked out of line in a short time.

Worn Carriage Wheels and Bearings.

Worn Carriage Wheels and Bearings will make timbers out of square. As the carriage wears more on saw, or log side, the base of the blocks should occasionally be leveled up, as they soon get out of square with the saw .

Lining the Wheels With the Track.

Stretch a line directly over the center of V rail, being sure it is straight (the track) and level; use plumb-bobs; next draw a line in front of mill as close to wheels as possible, this line is at right angles, or square with the first line. Be sure that the lines are exactly square or at right angles. Next, drop two plumb lines so as to be exactly the same distance from line and in front of and at the edge of the wheels; now measure accurately from line to edge of wheel; set them very near square, in an 8 ft wheel 1-32 lead is right. Line the upper wheel the same. If plumbs are hung in water they will remain steady. If edge of wheels do not run true, then this plan will not do, but use the centers in upper and lower shafts. In this case no cross or right angle line is used.

The Guides and Pins.

The Guides and Pins are very important. Metal is not the best; even babbitt metal will case-harden a saw in spots. Boiled hickory in oil is the best, or any hardwood. The pins should be kept over the boilers in a can of oil; kept as hot as can be and the longer they remain in it the nearer they will be like horn, which if could be used makes the best pins for any guide.

Keeping the slivers out is quite difficult with some guides. The whole width of the saw should be filled, so as to leave no space for the accumulation of bark, slivers or splinters.

Balancing the Wheels.

This can be easily done. Take some lead, size of a pencil, press it around one of the arms at rim; if wheel runs no better change it until there is an improvement; then add another, and so on, until wheel runs perfectly steady. Weigh the lead and procure weight and attach smoothly to prevent accumulating dust. Band mill makers will laugh at this idea, but it works and saves shipping wheel back to factory for no ordinary shop can balance such a wheel. Grinding sometimes causes them to be out of balance and often the best mills are not accurately balanced. Keep wheels clean inside and free from dust.

The Mill Right We Now Go to the File Room.

A well lighted steady room is necessary. Good machines and tools kept in order. Keep dust out of all bearings on grinder and don't fail to keep rollers oiled occasionally. In fitting up a saw it is all briefly summed up in **uniform smoothe work.**

No saw will run irregularly fitted. Please stop right here and think what this means; it means an absolute uniform tension and in the **right place;** saw equal on both sides; a uniform tooth and swage with corners **alike** and the extreme end or point sharp and keen. Then with the mill right the saw will run fine.

HAMMERING AND ROLLING BAND SAWS.

As stated a good circular man should make a good Band filer. The Band is not as intricate as the Circular, but is more delicate and will not stand abuse. In cut Fig. 12 E. D. and F. are three illustrations. Each saw has about the same opening and if you cannot readily detect any difference in them you are not the man for the business. E. is a saw that will not run at all. It will snake, shift and slip on the wheels, dodge at the head of the cut and simply will not take our hard pitchy pine, while in nice soft pine it might run fairly well. Please notice that the drop does not go out to the edge as in D. under 2, which shows that on a 10-inch saw one and a half inch from the edge is actually tighter when strained on the wheels than the edge; that is the edge is the longest. You can imagine the result of such

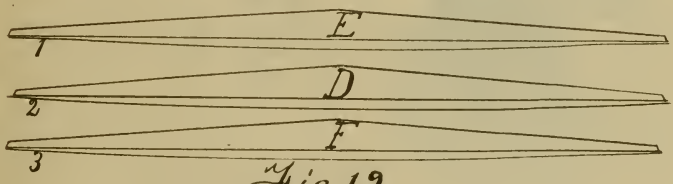


Fig 12.

a saw. This saw will require considerable rolling or hammering to get it right. It should be stretched first one inch from the edge, then gently one-half inch from edge and then a little one and one half inch from edge. At 1, under E. such condition is plainly shown, the straightedge almost touching the saw near the edge. Should the saw yet be too open open the edge gently until you can get a drop like F. If such a saw as E. is very open in center it may be stiffened up first which is a good plan. Then proceed to open up carefully. Do not try to get the required opening at once, but work the saw carefully near its width, using judgment, so that when you get the required opening the saw will drop like F. at 3. D. shows less opening in center than E. and more opening out near the edge. This saw is liable to crack, and is not a good saw; should it not crack, it will not hold its tension well. Remember that a 12in. saw like E. will snake though it may be so open as to not remain straight off the wheels.

Some good filers run their tension a little nearer the tooth edge and get good results. This is a good plan, but it requires more rolling to keep the back up, or right.

Testing Band Saws for Tension.

They are tested the same as the circular; that is by sagging and applying the straightedge as shown in cuts Fig. 1 and Fig. 2.

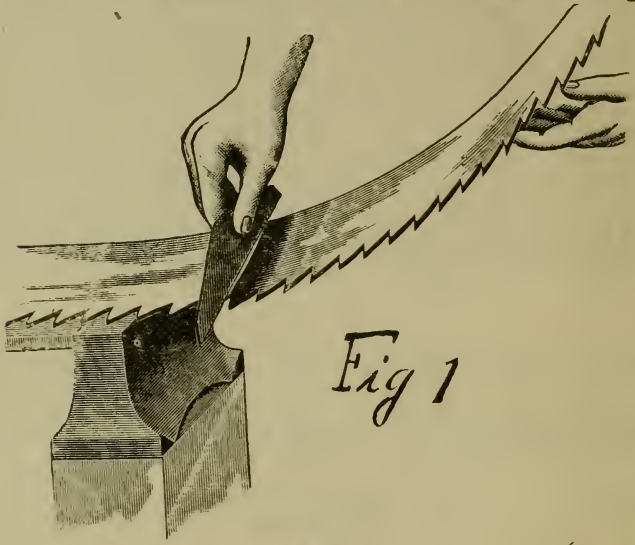


Fig 1

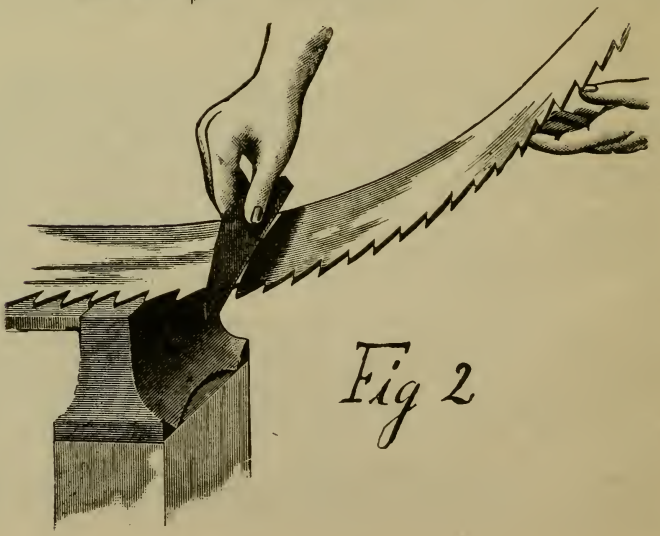


Fig 2

Fig. 1 shows a saw with tension; Fig. 2 shows a stiff saw with no tension, or rather shows the edges to be longer than the body of the saw. It must be hammered or rolled from within 1" of each edge, increasing toward the center.

By reversing this test; that is by bending the saw down and applying the straightedge on the outside of the circle instead of inside as shown; the conditions are reversed, that is a saw with tension will fit like 2 while a saw with no tension will show like 1. After rolling saw go over it carefully by this test with the hammer to remove what short places may show; then level up on block or slab.

What Causes a Saw to Crack.

D. shows a saw that will run well, but will crack on the edge. E. will not crack, note the difference in the opening under 2 and 3. D. shows the tension carried too near the edge. E. shows the tension not so close and shows that a strip of metal 1½ in. wide will sustain, the strain, the edge being a trifle tighter than what it is 1½in. from edge. The center being just long enough to not vibrate, for should center be too long saw will run out and in, but will not snake. Extreme cases of E. will crack on edge from vibration. It is not necessary here to refer to the common cause of cracks on back and front edge, but a few cautious remarks may prove of benefit. Be careful not to case harden throats. Do not let emery wheel cut so heavy as to warm the edge, or it will elongate and cause the saw to raise to the wheel heating and case-hardening the throats. If saws are abused and forced back against the roller, the back edge may become hardened in places, this is overcome by placing a piece of soft emery wheel against back of saw when mill is running slowly.

The Utmost Care.

Must be exercised to get saw of uniform tension. Words are not sufficient to express this important fact. A Band saw may be compared to a chain; if all the links are good but one, you see plainly the result. A space of but an inch of unequal tension is sufficient to cause a crack on edge.

Cause of Cracks in Center.

This is not of frequent occurance, but the center will crack if too open. Crowning wheels will cause saws to crack in center. A mill with no lead requires a saw to be hammered into log, and with crowning wheels the result is a bending of the saw in two directions. If wheels are crowning I would advise more lead than recommended, so as to hammer saw as near straight and flat as possible. Care must be exercised to keep saw true and free from lumps, for lumps will case-harden. If you doubt this take your file and attempt to dress such spots while saw is on the grinding wheels, and you will find that it tends to slip and will not take hold as it will on a part that is not bright or polished. Do not conclude that a bright saw is hardened. It should run bright its whole width. It is the spots that should

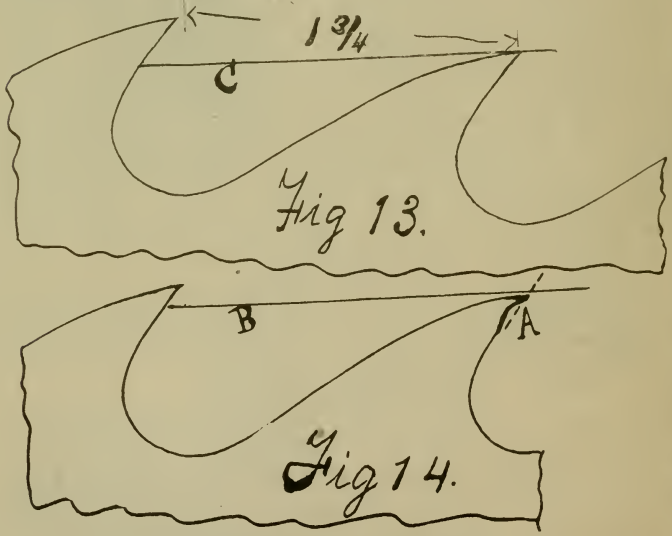
be guarded against, especially where metal lining is used in guides the whole width of saw. The guide should be only at the two edges with the center clear where metal is used.

Amount of Set Required.

Hard or frozen wood should have less set than tough fibrous wood. Two gauges on each side of saw is plenty for average sawing, and a saw that is nicely side dressed and is free from lumps may be run with less in hard or frozen timber. In soft fibrous wood 2½ gauges should be used. Swage a long taper swage. No man can run a Band saw that looses its corners.

On Swaging Band Saws.

The Eccentric or "Grass-Hopper" swage is in the most general use. Keep the die or anvil that rests on the top of tooth as close to the under die as possible, so as to not bind it, then it will swage clear out to the end. If corners are to slim, and you have no under dies suitable for thinner teeth, your only remedy is to run a thicker tooth.



If Teeth Crumble on Edge.

It is because they are to slim, or there has not been sufficient grinding on the front teeth. A tooth should be stiff enough that when brought to an edge it will stand. A tooth with less hook must be a thicker tooth to stand; with plenty of hook a thinner point will stand. **(See diagram of proper shape teeth and swage).** Fig. 13 and 14 show exact size of proper shape tooth. In some cases a little more hook may be run. I prefer

a rather stiff tooth for two reasons: 1st, a slim tooth will cause a saw to dodge around hard places in a log and make a man change his tension when there is nothing wrong, especially if teeth are a little too long. Teeth shown nave ample dust room for the heaviest feed; 2nd, a stiff tooth can be swaged to better advantage.

Fig. 14 A. shows a tooth swaged as a tooth should be; any filer who swages otherwise with a large gullett, will soon have teeth too slim to stand. B. shows a straight line on back showing the point hooked over. The first grinding the wheel touches only at A. directly on the point. A 1-32" face is ample and tooth will stand, as the wheel will not grind to within ⅛" of the point on the back. With this thin point back is not too high and tooth will not crumble. Should the back be ground up to the point at least 1-16" face must be on front or tooth will crumble.

The die will make a better and stronger finish on the back than is possible with wheel or file. This style of swaging saves a saw and will enable a filer to get one more run on his saws.

All the late swages will pull the point down, the point must not be pinched off, but brought to a feather edge; but little facing is necessary. Use no file, but let the wheel do all the work. Teeth that nick or crumble are not right; they should come off dull, but with a smooth edge. A good swage is over half the battle. Swage teeth so as to conform as near as possible to the shape you want, then the pressure side dress will not squeeze the metal sufficient to kink it. Good results are had by using the side dress on 2nd run.

The Use of the Rolls.

Set your roller perfectly square with wheels. Use true wheels and rollers to carry the saw around. Be very careful and not stretch the saw too much in one place or you will find it winding or dished. Use them carefully and only sufficient pressure to accomplish what is wanted. First go over the saw and mark the places needing opening. Make straight mark for tightest places, slightly crooked for less opening and zigzag marks for the lighter work. If the rolls will not feed through straight but vary on the saw, either the rolls in the machine ane not right, or the rollers that carry the saw are not in perfect line with the stretcher. After rolling saw go over it on leveling table, which should be a slab of iron. Level up principally with the cross pene hammer. I have said nothing about using the cross pene in removing twisted places.

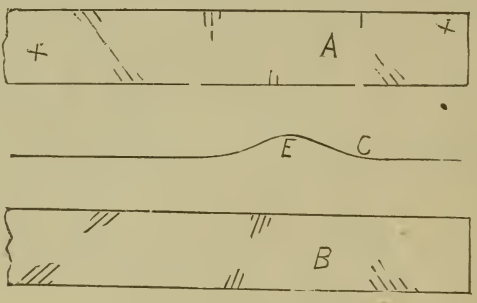
Twists in Band Saws.

This bothers many men. There are long twists and short twists in saws. The long twist is hard to locate and requires the utmost care, using a long straightedge, as such twists run so near parallel with saw that a short straightedge will not locate it. Put saw on leveling table, which should be mounted on nice rollers; use about a 24" straightedge, applying it along the saw at right angles from one edge of saw to the other;

apply it both ways or at right angles. When you locate the twist the straightedge will show a variation. Now use your long face hammer on the saw in the direction in which the straightedge showed the straightest or most light.

Cut Fig. 16 shows twisted places in a saw at various angles. The most work is to be done near the edge and must be done on the leveling block for the anvil would take out all the tension; E. shows a bent place which should be forced or bent back, as described further.

It is an easy matter to remove a twist in any saw. This is simple and applies to all twists in any saw. **Never use the long face across a ridge but parallel with it.**



These long twists come from various causes. If the hammer is used much for tension the face may not make a round spot; it will in time put a long twist in a saw. Short twists usually extend at about 45 degrees across saw and are easily located with 12" straightedge. **Do not attempt to correct a twisted saw before tensioning it.**

Suppose saw gets jammed and comes off the wheels and assumes something like a figure 8; roll it and there will be no twist when tension is restored. Saws pulled off the wheels often get short bends in them. Use a lever and a pry and force or bend such places back, being careful to set your pry same as if it was the long face hammer.

The Kinds of Hammers.

The doghead of about 3½ lbs. weight and cross face of same weight are necessary. The X face for removing twists. The doghead for leveling up on table or anvil. A good anvil should be at end of leveling table. **You must not** cut or mark the saw.

A lumpy marked up saw will not run well.

The tension may be right, but it will develop cracks and will not make good lumber and will wear guides very fast. The bright spots often develope cracks in center.

Polish Your Saws.

Take a smooth block and attach a piece of fine emery cloth; hold it hard against saw before taking it off on both sides. Lumpy saws will show the bright spots plainly and they should be hammered on the leveling block unless very prominent,—then on an anvil. This should be done occasionally on any saw, as it will be a great help in keeping saw true and smooth. This block of emery can be as well used on the leveling table if dsired.

Do not mark your saws if you want to keep out of trouble.

There is as much in a smooth saw as there is in proper tension. Do not make a spot on your saw that can be felt with the finger. You can run less set which means more feed and less work in keeping saw up.

Grinding the Wheels of a Band Mill.

Set machine perfectly square with shaft in wheels and not by the track, as it is possible for mill to be out of line a little. **Emery wheel must run true** and neat in bearings or wheel will be ground lumpy.

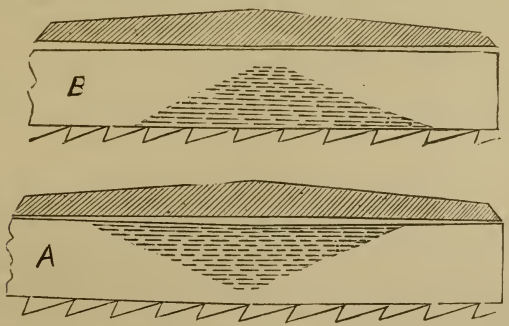
Dress wheel occasionally with a good dresser; grind perfectly straight across and run mill as slow as possible; should mill run out of balance, balance it as directed..

Speed of Band Saws.

About 8,000 to 9,000 feet for hardwood and 9,000 to 11,000 for soft wood. The more teeth the slower should saw run in hardwood.

Amount of Tension.

About 45 degree circle is the standard. Some men run apparently less tension than others; it depends on how they have



their saws tensioned. Some run a tight center line and open on each side of this; this would mean a comparatively stiff saw.

Fig. 15 shows how to correct a crooked edge. The front edge seldom gets too short; it gets longer, and the back must be kept up with it by rolling or hammering near the back edge as at A. In 6 feet saw should show about 1-64" full on the back; some run a straight back.

DOUBLE CUTTERS.

To the man who is well up, this saw is easier kept up than the single cutter. There is no surplus rolling of the back edge to keep it right, as in the single cutter. Tension the same on both edges and the utmost care must be exercised to keep it the same, or it will vary.

When saw varies on wheel,—that is runs back, it is a sure sign of metal being too tight beyond the teeth, as shown at 1 in Fig. 12.

Wide saws require to be watched more closely in this respect than narrow saws. The double cutter should have a trifle more hook; mill should be perfectly square with track and must be watched more closely than the single cutter.

Don't Do These Things.

Don't carry too much strain on your saw. If it shifts or slips on the wheels it is in the condition of E. Don't run your saw too far off the wheel. It will not stand up well and will tend to snake; ¼ inch over the edge is right.

Do not run saws too far back, and be careful in putting them on to tighten in right place, or the burr from the emery wheel on the saw will chafe the edge of the wheel off. Do not allow your saws to get bumpy. Keep them true, and the right set will act as a guide, while bumps will heat and change the tension.

Do not let the front edge get too long. By watching saw closely you can readily tell its condition. The back should be 1-64 full in 6 feet.

Do not get back edge too long, or saw will run back badly. Keep the saw right and wheels in line, and but little cross lining will be necessary.

Do not let saws run too long before giving them attention with rolls and hammer.

Remember This.

If a saw is to be kept perfect, it will require a little attention often for as often as the emery wheel grinds the throat, so often is the tension slightly changed, which will always be found irregular. So it is necessary to apply gauge often and correct this unequal tension, and your saws will not be run down before you are aware of it. A good anvil should be set in leveling table, and all short places that show to be unequal under the sag or drop test, should be removed on the anvil only.

Do not hammer places that are found in the saw while flat on the leveling table on the anvil, but always remove them on the leveling table.

Do not attempt to level any saw before you correct the tension. The leveling is the last process. Do not carry too much strain on saws. Remember this. That well fitted saws run with less strain than poorly fitted, and when more strain seems necessary examine your saw carefully and you will find it getting into the condition of E.

Do not run at a speed sufficient to cause mill to tremble or shake; better run at a less speed and get better results. 10,000 feet is a nice speed on a well balanced and well set mill.

Brazing Band Saws.

There are several compositions used in brazing band saws, what is in general use is (C. P.) Chemical Pure Muriatic Acid and Borax. A word about the latter. There are different grades of Borax, and only the best pulverized grade should be used. Some prefer to parch or bake it. Others apply a small portion of ordinary slate, finely powdered. My preference is the acid. The secret of a good braze with any flux, is the absolute cleanness of the laps. In using the acid have everything ready; solder in position; irons cleaned of scale; then apply the acid and irons immediately. If the acid is allowed to act upon the steel and ferment, the braze may not be good. You cannot apply too much acid and you cannot apply too much pressuse. Loosen the screws that clamp the saw after the irons are tight and see that back remains against straightedge. An orange red is better than a Cherry red. Use heavy irons, a little wider than lap, with the edges rounding. Keep them true by dressing often. The above applies to all widths of saws. Use good silver solder, and do not waste time with brass and blow pipe, which will harden in spots if pressure is not applied. Let me caution you to watch this process carefully, for once you get it right, you will use no other way. Tension a braze same as the remainder of the saw. If braze bends while hammering saw, it needs hardening.

Small Band Saws.

These saws require special care. The secret in this saw is a nice uniform set, teeth set near the edge, and not down into the blade as is often done. This demands a good set. Keep the back open so as to keep saw straight. Saws from 1" and over in width the tension should be watched, and do not hammer directly on the back edge but 1-3 the width the saw, hammering very gently towards the center. A saw that is too long on the edges will show the edges to be loose or flimsey when tightened on the wheels. A saw that shifts or runs against the roller is too tight in center, or too long on edge. A careful observer can soon detect a loose edge in a saw. The front edge being too long throws the strain on the back, just the reverse to what is wanted. On saws 2" wide and up the straightedge may be used. First spring the saw to a short curve and apply it inside the circle or curve. If the edges of the saw are too long they will show light and the straightedge will show a full place in center but when saw is straight will not show this defect. In this case ham-

mer or roll the center gently. All saws up to 2" wide should show to be straight across under the sag or drop test, and any saw, if only 1½" wide, shows a change under the drop test, it must be hammered. A saw too open will show some light in center. Remember they should be flat. Remove all kinks on a block, but the tension must be corrected by stretching the saw on an anvil or roller. To apply the straightedge opposite to what I have stated will show the condition in a reverse form. To be plainer if the straightedge is applied as on the outside of a hoop, a tight center will show some light, while a loose center will show the saw full in center.

These remarks on the small band saw are no more than what any band filer knows, but as these instructions will go into the hands of good circular filers, a little information will be of benefit. Use only round edge files on small band saws, and be certain that you do not mark the saw, when hammering it.

The secret of small saws is in the setting and filing. Keep saws sharp. It is a tedious job to care for such saws, but if good results are to be had, care must be exercised. Do not file square corners in throats of teeth or saw will surely crack.

Band Re-Saws.

They are treated same as log saws, but being thinner require much more drop or tension. From 25 to 35 foot tension is used on a 6" saw. The thinner the saw the more tension. Do not run a tooth ½ as long in length as on a log saw. Short teeth must be run or saw won't go. Plenty of hook and if dry lumber, but little set. On a 20 gauge saw, the No. 16 should fit it; on 18 gauge the No. 14, and in green, spongy wood a little more is necessary, while on bone dry wood, and a nicely fitted saw less can be run.

Eight inch saws require a less drop or tension; say 30 ft circle for 18 gauge and 40 ft for 16" gauge. The greatest care must be used in fitting the teeth and tension. They are very delicate and only a mechanic of patience can succeed. This is true with any band saw.

It is astonishing the amount of work a good well fitted band saw will do and the filer that is well up has no trouble in making from $6.00 to $10.00 per day for a few hours work.

Hardening or Tempering a Braze.

There are several plans, but the best is to remove the irons as soon as the red has disappeared and apply cold irons a trifle wider than the brazing irons; tighten under pressure and let remain until about cool. If the proper heat is left in braze this will prove to be the best method. It depends also on the size of the irons for if the heat does not run low enough and irons are too heavy; the braze will be made too hard and saw will crack.

By long use braze may become soft; the same process will harden it. In this case heat irons hardly to a red heat; this will

not disturb the solder and when saw gets hot remove and apply cold irons. This should be done in the clamp, as the heat will buckle the saw worse out of the clamps.

GANG SAWS.

This saw is little understood and is the greatest lumber maker in a mill, if properly kept up. The saws are not the most important; but the oscillation and overhang of the saws is of first importance; next to this are the saws.

These illustrations herewith show how to set the oscillation. This applies to any oscillating gang, and because it is not in accordance with the special directions with each particular machine, do not conclude that it is not right.

REASON IT OUT.

Saws should cut on the down stroke and the cut will compensate the weight of the sash, and will make the machine run steady; while out of the cut it shows to be out of balance. Should sash start down before saws take the cut, then there will be a pound in the machine and I have seen the oscillation monkeyed with until the sash would be ¼ down before saws took the cut; then it sounded as though the machine was coming out of the mill. In such cases the saws tend to lift the cants on the upper stroke, same as if not enough oscillation.

AMOUNT OF OSCILLATION.

Counting at the bottom of the cut, the amount should be enough more than the feed so that on the ascent of the sash there will be clearance as shown at Fig. 2 at A. (dotted lines show the saw cut) and Fig.. 1 shows that the sash has just begun to descend and is entering the cut at B. Should the sash descend but little more than past the center before saws enter there will be a pound, which will be hard on saws, as well as on machine.

Fig. 3 shows that saws are just leaving the cut as at C. If too little oscillation is had, saws will bring up considerable dust; there not being clearance enough at A, Fig. 2.

HOW TO SET THE OSCILLATION.

This is infallible; put a 12" board, say 2" thick, in gang as shown; have the rolls down tight as shown in cuts and with the feed on, now turn gang, by hand and watch just when saws take hold and when they let go; if they let go too soon at A, Fig. 2, then there is too much oscillation. Put the 2x12 on outside saw and run engine as slow as possible, and watch closely; you can easily see its action. Once set right, mark the eccentric, or crank, so that should it slip of be moved you can readily set it.

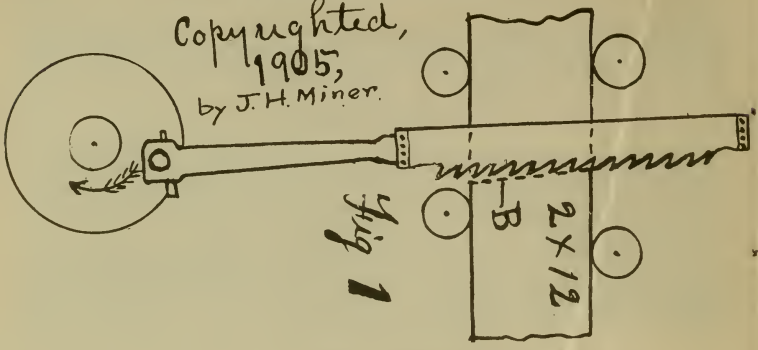


Fig 1

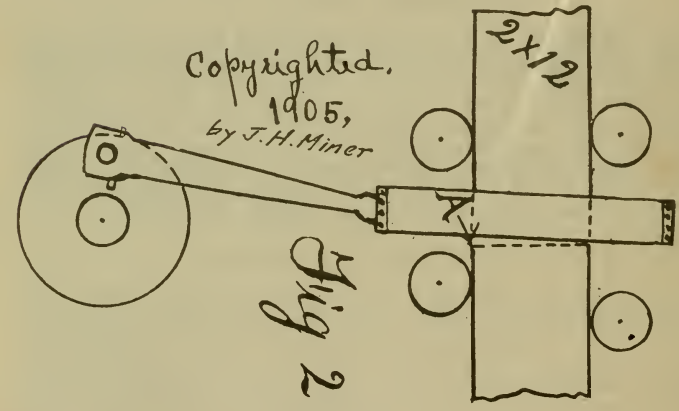


Fig 2

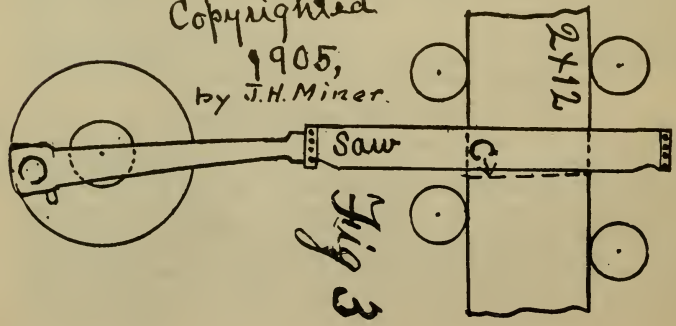


Fig 3

THIS IS IMPORTANT.

See that the oscillation is right or the gang is no go.

SETTING THE OVERHANG.

The amount of overhang should be a little over 1-16" to every foot of saw; a 36" saw should have from 3-16" to 1-4", according to the amount of feed. Remember that a variation of 1-16" will show in the run of the saws. Overhang in the saws at the top being that amount ahead of the stiles of the sash. Set saws in square and plumb, using gauges on back to get saws uniform. Set new saws well back, so the strain will be as near the front as possible.

FILING GANG SAWS.

File and swage same as band saw, but teeth must be closer and less hook; from 1" to 1¼" space is used. Some filers run as much as 4" to 6" hook in width of saw; others run nearly a straight tooth. Now if gang is strong and well kept up, and you want lots of lumber, then more hook.

But on the other hand, if blocks are allowed to run loose on the horns, and loose connections, by all means do not run much hook or saws will "grab" or "reach" and will almost wreck the machine,—especially in our Southern pitch pine.

If it happens that several pitchy, fat butt-ended, logs come together, then any gang will jerk, and the feed should be slackened until the 2nd roller is reached.

There are few foremen who have sense enough to know that a gang will not run smooth in all kinds of timber, which our southern pine represents. A few hard logs, and over to the filer they come. A few, however, have some reason;—No wonder the majority of filers are irritable.

The amount of set on a 14" gauge saw; No. 8 is the proper swage. In frozen timber No. 9. In some cases there timber is soft and frozen a little less is run.

If you want saws to stand up on a long run use No. 7 on 14" gauge, and the more hook the longer they will run, and the more feed they will carry,—provided machine will stand it.

Do not attempt to upset agang saw or your name will be "Dennis"; use a good under swage, same as a band, or a top swage if you wish.

HAMMERING GANG SAWS.

Open them more, one-third from throats of teeth to back edge, and do not give tension enough to dish. Open up to tabs, and if it is a machine with a buckle that draws from the center; it is immaterial about keeping back straight, as with a band saw. If a roller is had, then you can expand the back edge to keep it straight. I have had 8" saws so loose on the back

edge that after being keyed up I could almost spring them together, while the front was as rigid as could be. Those saws were 1-16" concave in their length on the back. The tension was, as stated, near the teeth. Watch the tension. They can get tight near the teeth and will not run no matter how open. Gang saws do not need much tension, if put in right.

WHAT CAUSES SAWS TO SNAKE.

Not sufficient set; too much or not enough overhang; oscillation not right,—and principally not enough tension, or it is not in the right place.

CANTS RUNNING TO ONE SIDE.

Saws not in square, or plumb; rollers not in line, and saws not striking the timber right. Follow these directions carefully and you will have no trouble. I have seen the time I would have cheerfully paid five times the cost of this book for this information alone.

SHINGLE AND HEADING SAWS.

These saws do not require much hammering if taken care of. They are so much thicker in the center that speed and gumming does not affect them as much as other saws.

Large heading saws must have plenty of tension; some saws as large as 72" run 1000 revolutions and require considerable tenson, but such saws are rare. From 40" to 60" is the size for heading. They range from 8x14 gauge to 7x12 with 90 to 120 teeth.

It is easy to determine whether saw has sufficient tension. It will "clip" or run down or out on hard blocks, and up or into the block on soft blocks; and will particularly follow the grain and heat on the rim.

A saw that is too open will act similar, but will not heat.

HAMMERING HEADING AND SHINGLE SAWS.

They must be remoed from the collar; the amount of tension they shoud have all depends on speed and size of saw; a 72" at 1000 revolutions could hardly be pulled through. A 60" at 1200 revolutions should lean about 45 degrees. A 40" at 1800 revolutions should lean about 6", while a 36" at 2000 revolutions should lean about 2". This same saw at 1600 revolutions per minute should just stand straight and not dish, but will have a loose flabby center.

Owing to their heavy center, a 12" straightedge should rock a little across the center of any of them and the greatest opening half way out to the rim, and from this half way point the tension must decrease, so that from 3" to 4" of the rim must be perfectly flat under the drop test.

HOW TO HAMMER.

Use a "slicker", a fine grade of emery wheel (such as saws are gummed and sharpened with); scrub the saw all over to within 3" of rim; now hammer a gentle, but solid, blow on all the bright spots to within 4" of center. Begin on straight side of saw; turn saw over and scrub the other, or flange side; hammer as before and continue until saw shows some tension. Be careful and don't hammer much nearer to the rim.

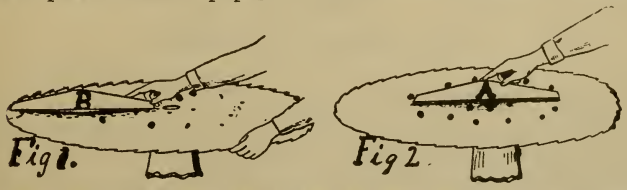
Now your straightedge, 6" or 8" or gauge comes in. The flange or collar part can be worked under the straightedge, but the taper part cannot; it must be worked on the straight side. Test saw as in Fig. 8 and places that show too much light or drop should be marked underneath; that is under the saw, while suspended as in Fig. 8. This applies to the taper part of the saw, for it can be tested only on the flat side; when saw is turned over scrub and hammer the bright spots at such open places. The straight part of the saw can be tested and hammered in the usual way. Now some will ridicule the idea of scrubbing the saw; however, such men will not succeed as any other way means a lumpy, irregular saw, and it won't run. Emery cloth can be tacked to a board and used in place of a fine emery wheel.

SMOOTH UNIFORM WORK NECESSARY.

More so in this saw than in any other. He who strikes too heavy and not a solid blow, and cuts or dents his saw, has already failed,—so sure will he make a failure.

TO REMOVE TWISTS.

After getting saw uniform and perfectly straight hang it on the hook and move it slowly and note any ridges, remove them as described with large saws. A place that is off or shows light should be marked and hammered gently on the taper side, and don't come nearer than 2" of rim. If ridge shows to extend right out to edge of saw, the edge should be lightly hammered with a piece of thick paper on anvil.



Figs. 1 and 2 show tests under a 20" straightedge; B shows the proper opening while A shows a tight center. With the right tension, A should show a little light, while a 12" should

show a trifle rock. It is a mistake to open clear across, same under A as under B. Saws that do not taper much, say 10x16, then the 12" might show a little light. The tension must begin quick from 4" of center to half way; then a gradual taper to within 3" or 4" of rim.

THIN SAWS.

Must have more teeth, and a higher speed, in which case 3" of rim must be flat under the drop test, which these tests in Fig. 1 and 2 are to show. Use a 6" straightedge to finish up and pass 3" of it over rim to determine how it is.

It is a mistake to extend the tension light to the edge, as saw will not run. Use the round face hammer 3½ or 4lb. weight. The long face to remove twists. Saws are often run so long without hammering on a warm mandrel, that when they are removed from the flange they assume a twist; such a saw under the B test will show full, exactly like A; or a saw that is very stiff will show B to rock a little. Such a saw is not twisted and only requires to be opened up in the body. Any saw that shows the test as in Fig. 1 and 2 must be hammered, first near the center, then as near as 1" and 2" of the rim. It is too light in center and must be hammered right around the hole.

..Go slowly there or you might get center too open and spoil the saw. It is possible for the tension to be all O. K. in a saw under the B test and it have a tight center; it will be necessary to hammer near the rim and let out the surplus tension. Study carefully Saw No. 1 and 2 on large circulars.

HAMMERING THE COLLARS.

This can be successfully done as follows:—first, locate the part of the edge that is down, or off, and take a sharp ball pene hammer and hammer gently the taper or under side. The dents will expand the outer surface and will force the edge up. Be careful that flange is solid on anvil, and by no means strike heavy or it might be broken. Some use a center punch and dress off the burr.

DON'T SEND IT TO A SHOP.

Nine times out of ten it will be spoiled by being thrown out of balance and but few shops can properly balance a collar.

Follow these simple directions and you cannot go wrong. Apply straightedge often and stop when collar is gotten perfectly flat, or the edge up a trifle.

Never attempt to hammer a saw on the collar; if it is out of true, insert pieces of paper at the low places and in this way the rim can be made to run truer, but when the tension is wrong nothing will do but to restore it by hammering.

Remember that a few blows lightly applied will help saw and that a few too heavy and in the wrong place will ruin a saw. A stiff tough tempered saw will require several hours work to correct it, unless you are experienced in hammering.

When saw is finished it should be a trifle low in center. For single block machines 1-64" low when tightened onto the flange; the center should be that much lower with a straightedge clear across saw. On double block machines saw should be very near straight, with a little more than given on machines cutting only from one side.

PROPER SHAPE TEETH AND SET.

Figs. 3 and 5 show teeth and swage. Fig. 3, A. B. C. and D. show various swage or set as used. D. is the full swage and many use this; it gives lots of work. I recommend more teeth and a set like A, or for soft timber B. will do. A. is a tooth that is occasionally up-set a little. B. is a tooth jointed more frequent than A. C. shows the result of not jointing saw. Only on a thick saw with ample power will it work. In fact, the point tapers from both sides. Some good filers twist their teeth a little, giving a clearance like under filing; this is excellent and when properly done will almost plane the shingles. Fig. 3, A. B. and C. show various teeth; A. is the result of running too long before gumming. Don't be surprised at loosing

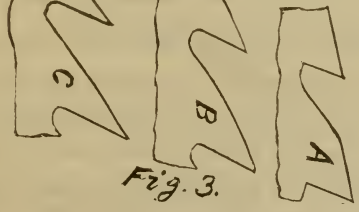


Fig. 3.

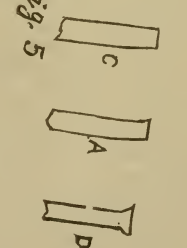


Fig. 5

some teeth by square corners, especially in a knot. Better gum a little more often. B. shows the proper shape; it is short and stiff, with ample clearance for dust. C. is too long a tooth; it will tremble and will not hold its set, nor will it do good work. Where 80 to 90 teeth are used on 14 gauge saws, a tooth ⅝ and in some cases ¾ long can be used; on 16x18 gauge ½ to ⅝ long. This is measuring on front of tooth to bottom of gullet.

Set saw as near the point as you can, and remember that a thin tooth will not run or hold its set. A double swage can be a thinner tooth than a set tooth.

For hand machines, hook should be a little nearer rim than half way. For power machines about half way is right. Keep dust out of pully or it will throw it out of balance.

SMALL SAWS.

Are hammered straight and stiff. Test them the reverse of the drop test, by center resting on edge of anvil and opposite edge under a support. Now bear down on front edge of saw.

A saw that is long on the rim will show light under straight-edge at A. and B. Hammer in the body of the saw, so as to expand the steel until it will show very near straight under this test, then your saw will be as stiff as a board. This test must be given re-saws or siding saws, for they can get long on the rim, yet be stiff and will not run well.

CONCLUSION.

It is expected that every man who receives this book is interested in improving himself and his saws, and to simply glance at the different subjects and to then proceed in a reckless manner means failure.

The filer who gets the best pay is the man who does the least amount of work. Its by practice, and constant study, that a man in this day succeeds at anything. You must keep up. There are several thousand men who indorse my theory of hammering and keeping up saws; but some "know-all," "bum," or "booze-fighter" condemn my method; don't listen to them. None of us know it all.

I have been studying saws for 30 years and don't know it all and never expect to.

Men are acquiring more knowledge in all lines, and the man who claims to know it all is watched. This book contains the proper theory on saws. You probably can easily understand the principles of tension in a saw, but putting it into a saw is something else. You need practice and patience.

These fellows who "fly-off" and "kuss" around do not amount to anything, and are setting bad examples; they never succeed and are always finding fault with men who are trying to.

After every word is memorized on the subject, and you do not fully understand, then write me, I will cheerfully answer any question, free of charge. Address

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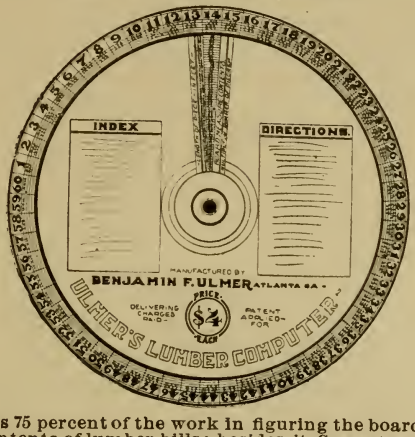

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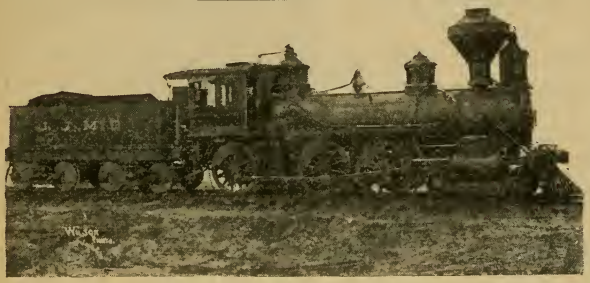

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